Telephony

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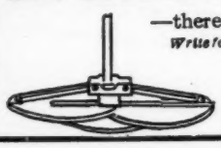

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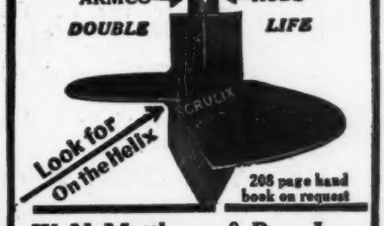

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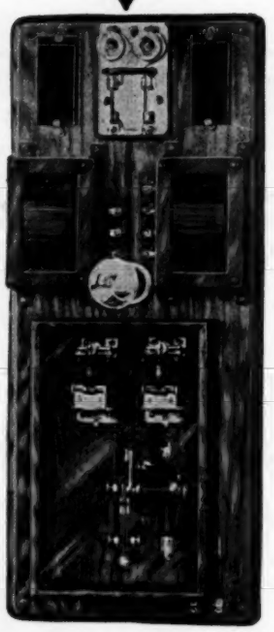

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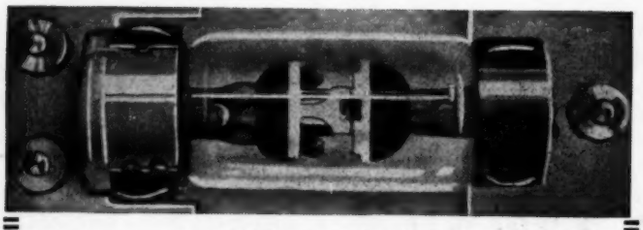

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Telephony.

THE AMERICAN TELEPHONE JOURNAL

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By the Way—

What effect does the purchase by the Bell of 32 telephone exchanges in Iowa have on the Kingsbury letter?

We put the query that way for, apparently, the Kingsbury letter had no effect on Bell plans to buy those 32 plants.

Is the Kingsbury letter a "scrap of paper" that Bell autocrats can ignore as did the Hohenzollern autocrats in Belgium? Or doesn't it hold good in wartime when the Bell interests are at work at Washington?

These are some questions the United States Independent Telephone Association should bestir itself to investigate. A report should be made on this case so that Independents will know the facts.

Business Must Go On.

Someone has wisely said that the duty of the man who stays at home in wartime is to remain optimistic, and in that frame of mind do all he can to help the men fighting at the front. The withdrawal of hundreds of thousands of men from the everyday activities of life either means that their places must be filled by others, or that those left behind on the peace jobs must speed up sufficiently to make up for their absence. That this will be done, there is no doubt.

The work will be done—that is certain. But too much emphasis cannot be laid upon the necessity of maintaining a hopeful, cheerful, optimistic spirit.

Already the common sense of the American people is beginning to act on the conviction that reckless economy would be quite as disastrous to the country as reckless extravagance. We need to conserve our resources—stop the wicked waste of food and other necessities—but if the war bills are to be paid, business must not be ruthlessly curtailed and held down to a stingy basis. As someone has said: "We must sit tight but not be tight."

To the vast majority of the people, patriotic duty consists in keeping the country's industries on an even keel so they will support the men at the front most efficiently. That is the way most of us can do our part in winning the war.

Observers of the business barometer say that signs show a constantly improving condition. Those who were inclined to be the victims of a war scare are regaining courage and find that there is not so much cause to fear as they had first supposed. It is said that Canada had a similar experience at the beginning of the war, when business suffered a severe setback, but soon conditions improved and an era of prosperity began that still continues. There is no reason why the same condition should not obtain in the United States.

Another cause for feeling more secure is the fact that the Senate at Washington is repairing the patchwork job done by the House in framing a war revenue bill. The old adage, "Too many cooks will spoil the broth," is usually exemplified whenever the lower house in Congress—with its 435 members—attempts to draft a big appropriation measure.

The hodge-podge program of the House threatens to hamstring many industries and deflect the very purpose of the revenue bill. The Senate promises to whip it into better shape, and achieve the object of garnering the golden eggs without killing the geese that lay them.

Perhaps, better than all, the prospects are excellent for big crops this coming harvest. More acreage than ever before and good yields in the principal crops should go far to enable America to face the situation with a hopeful though determined spirit. The real patriot is he who does his work with optimism in his heart whether he is at home or at the front—and good soldiers are needed at both places. Keep the wheels moving!

Holding Conventions.

Conventions that tend to stimulate business should be held the same as usual during war time, according to President Wilson. To a letter asking his opinion on the subject, the President said:

"I not only see no reason why commercial conventions should be omitted during the war, but should regret to see any instrumentality neglected which has proved serviceable in stimulating business, and facilitating its processes. This is not only not a time to allow any slowing up of business, but is a time when every sensible process of stimulation should be used."

The Latest Iowa Purchase by Bell

Review of Events Leading Up to Latest Violation of Kingsbury Commitment in Purchase of Farmers & Merchants Telephone Co., With 32 Exchanges in Northern and Western Iowa by Iowa Telephone Co.—Comments on Situation

By A Hawkeye Observer

Not so very many years ago, Iowa was regarded as one of the leading Independent telephone states. Then the Bell company inaugurated its campaign of buying and about seven years ago the heart was cut out of the Independent companies in that state by the purchases in the center of the state. Since then there has not been much buying directly by the Bell company.

Events Leading Up to Merger.

TELEPHONY'S simple announcement in last week's issue of the purchase by the Iowa Telephone Co., of the property of the Farmers & Merchants Telephone Co., which has been operating as an Independent telephone company in northern and western Iowa, thus adding to the property of the Iowa (Bell) Telephone Co. better than a half million dollars' worth of property heretofore supposed to be Independent, and entirely removing competition from a territory aggregating more than eight counties, inspires a review of some of the events leading up to this vast violation on the part of the Bell company of both the anti-trust laws of the United States, and the now famous, or infamous (?) Kingsbury commitment.

For many years the entire territory affected by this recent transfer or sale has been adequately served by a group of genuinely Independent telephone companies as follows:

Northern Telephone Co., with headquarters at Storm Lake, and exchanges at Fonda, Storm Lake, Sioux Rapids, Aurelia, Pocahontas, Newell, Gilmore City, Rembrandt and Varina, also a complete system of toll lines between all of these stations and 18 other towns occupied by mutual Independent companies having access to long distance service over the Independent lines referred to.

The Rural Union Telephone Co., of Humboldt, with exchanges at Bode, Bradgate, Hardy, Humboldt, Livermore, Ottosen, Renwick, Rutland and Pioneer. This company also had a network of toll lines connecting its own stations and a number of other smaller mutual companies in the immediate vicinity.

The E. H. Martin Telephone Co., with an exchange at Webster City.

The Jewell Telephone Co. with an exchange at Jewell Junction.

The Blairsburg Telephone Co. with an exchange at Blairsburg, and several other mutual companies operating in adjacent territory.

These companies maintained throughout their respective territories, and between each other, an adequate and satisfactory system of toll or long distance lines consisting of both iron and copper lines in capacity as indicated by the needs of the service, *all of which has been maintained in direct competition with the long distance service given by the Iowa Telephone Co. in the same territory.*

Something over a year ago, W. J. Brownell, the president and actual operator of a small group of Independent (?) properties in and adjacent to the town of Hawarden in the northwestern corner of Iowa, under the name of the Farmers & Merchants Telephone Co., suddenly manifested great opulence and commenced to acquire one after another those companies previously referred to. The telephone property at Storm Lake, about 125 miles to the east of Hawarden, was purchased and this permitted the acquisition of a number of exchanges in contiguous territory.

The company was getting close to the territory of some real prosperous Independent telephone companies—those at Rockwell City and at Fort Dodge—and there were toll line connections to those places. In the spring of 1916 the Independent plant at Webster City, 25 miles to the east of Fort Dodge, was purchased by the Farmers & Merchants company, together with some exchanges to the north of the Fort Dodge territory. By this purchase the Farmers & Merchants Telephone Co. occupied territory which bounded the territory of the Fort Dodge and Rockwell City companies on the east, north and west.

Independent Toll Connections.

There were Independent toll connections from Fort Dodge and Rockwell City to all of the exchanges in the territory of the Farmers & Merchants company. Toll lines also extended from Fort Dodge and Rockwell City to Sioux City, a distance of 146 miles from Fort Dodge. The Bell company also had toll lines which in many places paralleled the circuits of the Independent companies.

The large quantities of money apparently at the disposal of this former bond salesman at once created suspicion in many minds that the Bell had commenced another big grab. This suspicion was strengthened by the fact that Mr. Brownell, in enlarging his organization, used only former Bell employes for responsible positions, and purchased practically nothing but apparatus made and furnished by the Western Electric Co., although he never at any time ceased his profession of being an Independent telephone operator.

These suspicions continued to increase in strength in the minds of everyone who knew anything about the circumstances, except the officer of the United States Independent Telephone Association, who was delegated to examine the situation in this territory, and, who, after quite an investigation reported to the directors of the association, that he was convinced that the Farmers & Merchants Telephone Co. was a bona fide Independent. Perhaps *some* definition of the word "Independent" may justify his opinion but TELEPHONY'S announcement of the *actual purchase* leaves no further doubt as to the correctness of these original suspicions in the minds of the men who knew the local conditions and were *willing* to believe.

Long Distance Competition Destroyed.

By this purchase *actual long distance competition* between the Bell and Independent lines in the territory affected, has been destroyed. This competition has been beneficial to the general public as may be proved by citing the Independent rate of 70 cents from Sioux City to Fort Dodge as compared to the Bell rate of 80 cents between the same points.

By this purchase the anti-trust laws prohibiting monopolistic control of competing common carriers is openly violated, to say nothing of the old and hapless Kingsbury commitment, which is an actual and direct promise on the part of the American Bell telephone company —and all its children—not to acquire *competing* telephone properties without first securing the consent of the government of the United States. This promise is also openly violated by the same act —unless the government has given consent. Perhaps this has been secretly done —certainly it has not been openly done —but neither the public nor the larger Independent companies immediately in connection with the properties involved, have as yet had any notice of this consent from any source, although the government officials are charged with pro-

(*Concluded on page 27.*)

Appeal to Telegraphers' Patriotism

Minimum of 600 Telegraphers Required for the Battalions of the United States Signal Corps Being Organized by the Central War Department—How It Is Planned to Raise the Men—Importance of Signal Service

Lieutenant-Colonel Wildman, department signal officer of the central war department, at Chicago, authorized to organize a number of battalions of the signal corps, and finding the number of enlistments of telegraphers not meeting the requirements for these first battalions, is appealing to the patriotism of the telegraphers. There are many thousands of qualified telegraphers in the central department, therefore it is believed the poor showing made in enlistments is due to the fact that the duties of the signal corps have not perhaps been made well known.

For the battalions now authorized in the central department, there are needed a minimum of 600 telegraphers. While the enlistment of other classes of men for the signal service is practically complete for these battalions, only about 25 per cent, of the required telegraphers have come forward. To overcome the failure to secure this class of signal corps men, it appears that it will be necessary to open telegraph schools in which Morse and radio telegraphy will be taught to young men who desire to enter the signal corps rather than the other branches of the army service.

A number of schools have already volunteered their services in conducting such schools. Foremost among these are: the Armour Institute of Technology, Chicago; the Iowa State College, Ames, Iowa, and the Dunwoody Institute at Minneapolis, Minn.

It is expected that this course of training, which now appears the only method of securing the required number of telegraphers, will be open for young men within the age of conscription, and those between 18 and 21, who, upon enrollment, will signify their willingness to enter the signal corps when qualified.

It is desired to secure voluntary instructors, who are experienced commercial telegraphers from commission offices, railways and other similar interests. It is believed that a large number of these skilled men who are unable to enter the military service, will recognize the opportunity to discharge a patriotic duty to their country, and will signify their willingness to assist in this work. Lieutenant-Colonel Wildman desires to have such volunteers send in their names, present employment, business and residence addresses, as well as the hours during which they could perform such service as instructors.

To continue the operation of the lines of transportation, as well as commercial telegraphic communication, it is necessary that a large number of telegraphers remain in their present employment. It is therefore imperative to produce the required number of telegraphers by some educational method, conducted by the already-organized schools of this country, under the supervision of the officers of the signal corps.

A French Artillery Observation Post—Telephone Station in the Trenches.

The actual recruiting for the battalions authorized in the central department is in the hands of Captain John A. Kick, a veteran of the Spanish-American war, who operates under instructions from Lieutenant-Colonel Wildman, and a vigorous campaign of advertising and publicity is in process of formation. First Lieutenant Roscoe H. Johnson, an expert telegrapher, will be in charge of instructors to be furnished to various schools taking up this work.

Brigadier-General George O. Squier, present chief signal officer, U. S. A., is the man on whose shoulders rests the big responsibility for keeping up to the mark—and, if possible, a bit beyond—the "eyes, ears and nerves" of the army, better known to the layman as the signal corps. General Squier perfected the most approved system of multiplex cable telegraphy, and lent his remarkable inventive genius, energy and influence to the Wright brothers, Orville and Wilbur, at a critical stage of development of the aeroplane for military purposes.

The signal corps has recently addressed a letter to presidents of colleges and universities, asking their co-operation in a plan of instruction for telegraphers and prospective telegraphers. Six thousand young men are needed for the first army of 500,000, and it is proposed to teach telegraphers the elementary knowledge of physics and electrical engineering. High school graduates and college men will be given this instruction, and a course of telegraphy in addition.

The signal corps will furnish expert telegraph instructors, and the college and universities are being requested to furnish the theoretical and laboratory instruction. Young men desiring to avail themselves of this opportunity should apply at once to the signal office headquarters. If found eligible, they will be assigned to class for the course of instruction, which is expected to occupy from three to five months, according to the ability of the student. At the conclusion of the course they will be enlisted in the signal corps, according to merit.

The unusual number of men required cannot be taken from the commercial and railroad forces without jeopardizing transmission of government business.

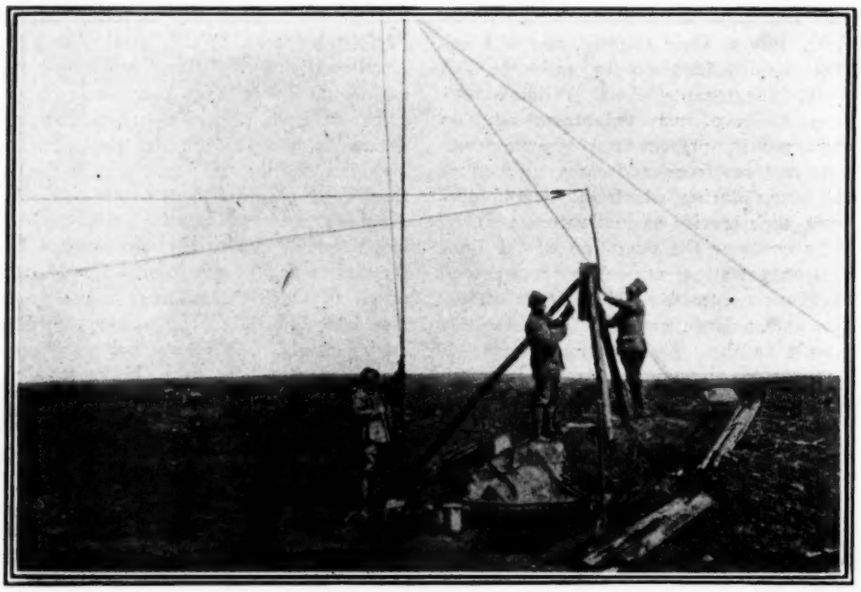
Melville E. Stone, general manager of the Associated Press, has recently suggested to telegraphers in that service that, while the company is reluctant to lose any employe, the imperative need of the government is recognized and men who are subject to the draft should not wait for that formality, but volunteer for the signal corps, where their ability can best be utilized.

In time of peace the signal corps is perhaps the least heard of branch of the army. In time of stress it is a most vitally necessary arm. It is the "nerves" of the army, and, as such, a major factor in the conduct of military affairs. In fact, the last three years of war abroad

seem to indicate it as the paramount element in the control of modern warfare.

Brigadier-General Scriven, former chief signal officer, in "The Service of Information," says:

"In the United States the transmission of military information is wisely placed in charge of one body—the signal corps.



Arranging the Lead-In of a Wireless Aerial on the French Front.

The advantage of this concentration has been proved; and it is not perhaps saying too much in claiming for this corps as high a standing of faithfulness, industry, intelligence and efficiency as do or can exist among any body of soldiers the world over."

It is this point that Colonel Wildman desires to drive home to the telegraphers of the United States—along with the fact that the enormous and sudden expansion of the United States army demands an unusual number of men at good salaries, immediately. Congress has recently doubled the pay of the private and increased the remuneration of each non-commissioned officer. The signal corps has a greater percentage of non-commissioned officers than any other branch.

The pay of a corporal is now $36 per month, in addition to food and clothing and medical attendance when needed. The rating of a sergeant is now $44, with the same subsistence; that of a sergeant, first-class, $51; and the master signal electrician—and many telegraphers have most of the requirements in this direction—$81. The signal corps is a mounted service. A knowledge of horses, if not already possessed, must be acquired, and a healthier life in the open is one of the most attractive offerings of this branch of the service.

Brigadier-General Scriven says: "In war, as in peace, changed methods of intelligence communications have been due to many agencies; chemistry and the mechanical arts have, of themselves, done their share and given us air craft in its varying forms, the searchlight, the heliograph, the acetylene light, pyrotechnics and many other useful devices.

"But other agencies have played their part, and the fighting world no longer moves only on the surface of land and water. Indeed, advances in the arts of peace have vastly increased fighting power in war. The application of science to the usual business of life, while it has multiplied the comforts of man and perhaps increased his welfare, has also augmented his killing powers. At no period of the world's history has this truth been better illustrated than in the tremendous application of science to war made by the fighting nations of Europe.

If we consider for a moment the value of this application to the transmission of military information, shown in the use of the telegraph and telephone today in Europe, and long ago by our own army in Cuba, the Philippines, and in China, and note the importance of the radio, to say nothing of the surpassing influence of the aeroplane and the many applications of science to the service of war, it should seem unnecessary to dwell upon the military value of these aids to war. However, there are still people of intelligence, who, in practice, think that the transmission of military thought is summed up in the use of notebook, the orderly, and his horse.

But these are passing, and the trained soldier and educated volunteer understand the vital importance of time in military operations and the need for the immediate transmission of information. Hence, the necessity for a signal corps or its equivalent. Without its aid modern armies can no more be controlled than can great railway systems. The commander in the field remains blind and deaf to the events occurring around him, incapable of maintaining touch with conditions, and out of reach of his superiors, or those under his authority, upon whom he depends for the execution of his plans. The brain lacks the power of control, because the nerves are wanting. Time is the main factor in war—to arrive first with the greatest number of men, and with the clearest understanding of the situation, is to succeed. The last, and often the first, of these conditions depends upon the lines of information of the army."

The signal corps is charged with the building up of an efficient aeronautical service. This branch has been proving the most attractive for the young recruit in recent months.

General Scriven says that the duties of the signal corps for intelligence communication are not confined to the transmission of information alone, though that is its principal function. In addition to this service, its troops will have plenty of fighting, if not plain soldiering, to do, not only with the infantry outposts and at detached stations, but with the cavalry in reconnaisance work, and with both, when serving with contact troops and with patrols. Indeed, this corps, whose soldiers are classed as staff troops, is, while in service, kept by its duties in the forefront of military operations. In the war with Spain, as in more recent border troubles with Mexico, it has suffered greater proportional losses in killed and wounded than any other branch of the army.

All telegraphers who will volunteer for this patriotic duty should immediately either call in person or send their names to Lieutenant-Colonel Wildman, Room 1320 Consumers Building, State and Quincy Streets, Chicago, Ill., as several schools are now ready to start courses, and are only awaiting the necessary force of instructors.

The illustrations which accompany this article are reproductions of French official photographs.

In the field battalions there is still room for telephone men. The ranks of the battalions being raised by the Independent telephone companies are not entirely filled. Those of draft age who have not volunteered are urged to send in their applications to the various group chairmen. Act at once.

In addition to the men enlisted by the southwestern group of the central war department, comprising Missouri, Kansas Colorado, and published in last week's issue of TELEPHONY, Chairman A. F. Adams reports the following to have been examined, accepted and sworn in:

Herman E. Bloess, Sedalia, Mo.
Thomas W. Bunker, Bunker Hill, Kans.
Fred W. Carlock, St. Louis, Mo.

Charles B. Ellis, Jr., Maryville, Mo.
James R. Estes, St. Louis, Mo.
James T. Freeland, St. Louis, Mo.
William H. Frohoff, St. Louis, Mo.
William G. Gallagher, Tipton, Mo.
Lewis C. Haege, St. Louis, Mo.
Charles H. Hall, Sedalia, Mo.
George A. Holvey, Kansas City, Mo.
Henry H. Jabes, Howard, Kans.
George V. Miller, Sedalia, Mo.
Roy E. McGee, Joplin, Mo.
Edwin T. McIves, St. Louis, Mo.
Ralph O. Moore, Wilson, Kans.
Sewood G. Nelson, Lamonte, Mo.
James E. Norlin, Sedalia, Mo.
Cullis Plummer, Joplin, Mo.
Thomas Roberts, St. Louis, Mo.
Charles E. Smith, Hutchinson, Kans.
Oliver O. Vincent, St. Louis, Mo.
Roy E. Wells, Joplin, Mo.
Raymond Wheeler, Golden City, Mo.
Virlie Wheeler, Golden City, Mo.
Lawrence White, Joplin, Mo.
Denton L. Williams, Rich Hill, Mo.

First Contingent of Women Telephonists and Telegraphists.

The latter part of May the first contingent of women telephonists and telegraphists left England for France to play their part in the scheme for relieving for other duty soldiers now employed at the base of work which can be performed by women. They are the first selection from the satisfactory number who responded to the call for telephone and telegraph volunteers.

In the accompanying illustration, which is reproduced from the Telegraph and Telephone Journal of London, are shown the telephonists proudly wearing their khaki uniforms. Though businesslike and practical, the uniforms are smart and becoming and appeal to the aesthetic sense of the wearers—and the lookers-on as well.

An editorial in The Telegraph and Telephone Journal again calls attention to the great and worthy part telephonists have played during bombardments, air-raids, explosions and other terrifying emergencies incident to the war.

Fundamental Patents on Pupin Loading Coil Expire.

On June 19, the first Pupin patents covering loading coils in this country, expired. They were patents No. 652,230 and 652,231, issued June 19, 1900, and covered "Art of Reducing Attenuation of Electrical Waves and Apparatus Therefore." Dr. Pupin has other patents on loading coils which expire in November, 1919, and June, 1921. Those which have just expired, however, are probably the broadest.

The application of the Pupin loading coil to long distance lines has resulted in a great improvement in, and extension of, telephonic transmission. Up to the present time, however, Independent telephone companies have been unable to secure these loading coils, owing to these patents being held by the Bell company, which confined the use of the coils exclusively to the Bell companies.

Pattonsburg (Mo.) Home Acquires Additional Property.

The Pattonsburg Home Telephone Co. of Pattonsburg, Mo., was recently given permission by the Missouri Public Service Commission to purchase the property of the Jameson Telephone Co., which comprises exchanges at Jameson and Coffey, Mo. The combined properties will now have a subscribers' list of about 1,200 telephones.

E. O. Turner, formerly of Davenport, Iowa, is president and general manager of the Pattonsburg Home company. Some improvements will be made of the lately acquired property. The Pattonsburg property is said to be one of the best built plants of its size in the state.

Receiver Appointed for Home Company at Portland, Oregon.

Federal Judge Wolverton has appointed Oswald T. West, ex-governor of Oregon, receiver of the Home Telephone & Telegraph Co., of Portland, Ore.

First Group of Women Telephonists Who Left England for France the Latter Part of May.

Some Forgotten History

Refreshing Your Memory—Some Southern Ways

By J. C. Kelsey

As I write, I am in a historic city. It is a city which, while possibly unknown to telephone men, was once the most conspicuous place in the world.

As I write, I am in the room at the desk even used by men who boldly and conscientiously discussed things unbelievable today, and gave final touches to thoughts which, when once germinated, startled history.

Only a few feet away, Jefferson Davis took the oath of office as president of a new republic destined to live but a few troublous years, yet giving our republic its supreme test. It was in this Alabama state house that slavery received its death wound, and our great ship of state received its baptism of fire.

Montgomery today is a placid capital city. Its great wide streets are reminders of the time when our original surveyors had more land than they could handle—they unconsciously left many of our cities with a paving-bill heritage which has made taxes more of a condition than a theory.

These great wide streets teem with soldiers. From their bronzed and sturdy appearance it is easy to account for the courage of their fathers, the men who charged across the fields of Gettysburg and other scenes of carnage. Where once flew the first flag of a new republic, now floats the Stars and Stripes, and only a few surviving members of that great upheaval even remember any difference.

It proves that time is a great healer and that once again we may visit Germany, or a German visit England and France, wondering why men and institutions were so foolish to fight over such vague things.

It should give comfort to the man of pessimistic mind that the world is not coming to an end at all, but is getting rid of some sort of an excresence, so that its body will be healthier for future generations.

Today, we think it is strange that men should get excited about slavery. In fact, we have forgotten that men were ever enslaved. We would think it equally strange if New York in voting for Hughes so strongly, should have seceded from the union of states because Mr. Wilson had been re-elected.

Tomorrow, we may think it is equally strange, and unborn children may yet puzzle themselves over the trivial causes which have made Europe a hell.

The things men think the most important usually turn out unimportant, and it comes to every man the thought that he has made a fool of himself over one thing or more which did seem absolutely necessary. But men have a habit of fighting for what they want regardless of how foolish it may look to future generations, so war will never vanish from earth because future generations in time will get some equally foolish idea, and fight for it as long as life lasts.

We cannot blame the past generation for any deed or misdeed.

What a curious history! General Lafayette came to Montgomery, Ala., in 1824, and was, of course, received with wild acclaim. That was 93 years ago, and the youngest debutante who blushed as she was presented to this great hero, long ago grew weary in age, and has lain in a forgotten grave.

Fifty-seven years ago, men came to Montgomery with hatred in their hearts, and turned the community into enemy territory. It was hard to realize that this locality was that same place which reeked with hatred of our Union, whose people flocked to hear General Wood tell of the war needs, and that Montgomery was going to return General Lafayette's visit of 93 years ago by sending grandsons of the girls who danced at the Lafayette ball.

Surely few locations have so much vital history crowded into nearly a century.

It seems strange indeed to us, but in 1860 there was an election which bade fair to change the political character of the White House. It was plain that a split in the prevailing party would cause the election of the candidate of a new party.

We all remember how the Roosevelt-Taft conflict made it possible for President Wilson to have a four years' occupancy of the White House. So, in 1860, it looked very much as if a "black" Republican by the name of Lincoln might be elected. It was so alarmingly possible that the legislature of Alabama began to worry about it.

The more they worried about it, the more possible it seemed. So they authorized the governor to issue a proclamation ordering an election to be held for delegates to see what action they should take if the "black" Republican should happen to be elected. Anyway, the "black" Republican was elected, and Abraham Lincoln, The Great, became president at a time when so many men had large chips on their shoulders.

The governor was reminded of his duty by a gigantic petition, and on January 7, 1861, the election of delegates was held to decide what they would do.

It must be recalled that the dissatisfaction in Alabama was not unanimous, because when the delegates arrived at Montgomery, it was a case of 50—50. Two factions developed, in which one quietly favored staying by the good old ship—U. S. A.—while the other noisily declared for leaving it.

For a time it seemed as if the election of Lincoln were not going to be noticed, because fifty men out of ninety-nine seemed determined to prevent the coming cataclysm. But human nature is usually the same. The noisy ones had their way, so that by a narrow squeak of 53 to 46, the world's great tragedy was decreed.

Those who protest at California deciding the last election should take comfort. Anyway, the triumphant 53 put forward the following resolutions:

"Whereas, The election of President Lincoln and Hannibal Hamlin to the offices of president and vice-president of the United States of America, by a sectional party, avowedly hostile to the domestic institutions, and to the peace and security of the people of the state of Alabama, preceded by many and dangerous infractions of the constitution of the United States, by many of the states and people of the United States, by many of the states and people of the northern section, is a political wrong of so insulting and menacing a character as to justify the people of Alabama in the adoption of prompt and decided measures for their future peace and security; therefore

Be It Declared and Ordained that the state of Alabama now withdraws from the Union, known as the United States of America, and is, and of right ought to be, a sovereign and independent state.

Be It Further Ordained and Declared that all the powers over the territory of said state and over the people thereof, heretofore delegated to the government of the United States, be and they are hereby withdrawn from said government, and are resumed and vested in the people of Alabama.

Be It Resolved that the people of the states of Delaware, Maryland, Virginia, North and South Carolina, Florida, Georgia, Mississippi, Louisiana, Texas, Arkansas, Tennessee, Kentucky, be and are hereby invited to meet the people of Alabama on February 4, 1861, at the city of Montgomery, for the purpose of consulting with each other and securing concerted action in whatever measures ma

be deemed most desirable, for our common peace and security."

It seems that South Carolina had already seceded but had not issued any general invitations. But Alabama invited other states and that seemed to bring the matter to a head. Five states sent delegates, among them South Carolina, Georgia, Florida, Mississippi and Louisiana. It so happened that 53 men out of 99 carried the resolution which invited these delegates to Montgomery.

Forty-one men responded, and this time there were no factions—the delegations were solid. These 41 men meant business and on February 8, 1861, adopted a constitution and fixed the following day to elect a president. So, in the room in which I write, Jefferson Davis, of Mississippi, was unanimously elected president of a new republic, while Alexander Sleffins, of Georgia, was given the vice-presidency.

Jefferson Davis was at his home in Mississippi. It took some time to notify him, but he managed to reach Montgomery one week later and proceeded on February 17, to carry out the plans of inauguration. He took his oath of office upon the steps of the state house while cannons boomed and whistles shrieked the news of the birth of a new republic on the face of the earth.

As one looks down upon this peaceful city today, while standing on the spot where Jefferson Davis did, he cannot help but wonder what Jefferson was thinking of, himself a ward of the nation and a soldier.

Did he see himself trying to escape in a woman's garb a few years later? Was his heart heavy or what? What man today would accept such a task?

Montgomery did not hold the seat of government long. The community which conceived the great idea of a state starting life on its own hook, was soon lost sight of in the larger problems brought on by the war. The capitol was moved to Richmond, which act saved the city from being the scene of great fighting, such as Cold Harbor, Spotsylvania, and other historic engagements.

It was not until 1865 that General Wilson and his cavalry appeared and took charge of the city. Before General Wilson could get action, nearly 90,000 bales of cotton were destroyed by the retreating forces. Cotton at that time was 50 cents per pound. Those who think that the present price is high, can seek comfort in history.

It is sometimes asked why the descendants of the men who wanted to leave the Union because a "black" Republican might be elected president, did not take more kindly to telephone liberty.

In the Middle West, the people flocked to the telephone business. Every hamlet once denied telephone service, began to show the use of a telephone for nearly every family. In these states, the old companies were driven into bankruptcy. Had it not been for financial relief from the parent company, it is doubtful whether a Bell telephone would have remained between the Rockies and Alleghenies.

It is true that the Southern country did make a good start, but it was usually made with Northern money. Where the Northern financiers had faith and furnished enough money, the enterprise went on to success. But where enterprises were launched by Northerners and no extensions furnished, naturally affairs languished and a sale of the property followed.

We have only to look at Davenport, Moline and Rock Island, where some Pennsylvania capitalists put up a few thousand dollars to start a telephone enterprise which needed a few million. Naturally, it did not take the Bell company long to put in telephones which the people wanted and could not get from the new company which could not grow.

Today, if the Southland were called upon to take care of its telephone needs as it was 20 years ago, there would be a different story, for the Southland has money, and plenty of it.

There would be no room for the Northern promoter who came with limited money and hopes of selling to the Bell company. The Southern man, with today's advantages, would have built to stay, and there would have been a dozen Knoxvilles, Bristols, High Points, Tampas, Thomasvilles, Mobiles, and other successes where there is one of each, today.

The Liberty Loan was oversubscribed—the people of the South took their full share. We all thought Chicago had a great burden to carry, but the Montgomeries and Atlantas had an equal share.

The day of a dependent Southland is really and truly over—even the boll weevil is being successfully fought. Crops are diversified, and the story of the negro and his mule in the cotton field is past history.

On my hotel door is a notice that the hotel will not be responsible for revolvers, money and jewelry left in the bedrooms. Such a notice gives the wrong impression, because the soft-spoken Southern man has no more need of a revolver than a submarine. Men are polite in this sunny land and no one can resist their courteous ways—and they should not, for underneath that gentle way lies a smouldering spark which can flare to a great flame.

In a telephone way, the success of the Southern Bell company, in avoiding the rocks which some of its Northern associates hit, can be attributed to an organization of Southern men who have ever been, at least outwardly, courteous and gentle, and able to disarm their critics.

The chase of the dollar is just as earnest as in our Northern country, but they do have more outdoor life and more real life.

MORAL: All things, as a whole, work out for the best.

Telephone Men Build Prison Stockade for Interned Germans.

Major Winston, in command of Fort McPherson, Atlanta, Ga., was notified on March 23, that the interned German sailors would reach Atlanta March 27 and was ordered to be prepared to receive and properly guard them. This meant that buildings must be renovated and a stockade erected and wired, all in the short period of three days.

As the Southern Bell Telephone & Telegraph Co. had placed its resources at the disposal of the government at the beginning of the preparedness campaign, Major Winston called upon the district plant chief to secure the assistance of the company's construction gang. By 10 o'clock the following morning the telephone company's force was on the ground actively engaged in erecting a stockade.

This stockade was built of 4½ in. timbers 14 ft. long, set 3 ft. in the ground. On the top of each post an extension arm of 2½ ft. plank was nailed, making the post and arm resemble an inverted L. The posts were set about 8 feet apart and the distance around the stockade was almost a half mile.

After the posts were up, 43 strands of barbed wire were strung on the vertical posts and eight to ten more were strung on the extension arms. In addition to the horizontal wires, diagonal wires were laced in every three inches, making a German-tight fence.

On the inside of the stockade about six feet from the main fence, a four-foot fence was built for a dead line, beyond which the interned men could not go.

Outside the stockade sentries are posted at convenient intervals and the whole stockade is under constant surveillance of the guards day and night.

Realizing that an emergency existed, the telephone men worked with a will and by Sunday evening, at 6 o'clock, the stockade fence was erected, horizonal wires placed and the remainder of the work almost completed.

To Install New Equipment.

The Grayson County Telephone Co. will shortly install a new switchboard and a chief operator's desk at its local exchange in Leitchfield, Ky. The improvements were made necessary as a result of the increase in the volume of business handled by the company.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

698. Explain why the trunk circuit, suitable for use with the ordinary two-wire common battery multiple circuit, may not be used with the differential relay line equipment. Explain how the local operator is apprised of the toll operator answering the recording trunk signal when the trunk circuit shown in Fig. 215 is used.

699. Why does the relay, *B*, Fig. 215, remain energized as long as the plug of the *local* cord pair is retained in the trunk jack? What finally releases the relay, *C*, Fig. 215?

700. Outline the general standard operating routine for handling toll traffic when the call originates in the local subscriber's station. When the call comes in over the toll circuit and is completed by calling a local subscriber to his telephone or a pay station?

701. What is true of the general practice? Outline modifications in operating routine falling within your own experience. What is the prime requisite in any new telephone circuit?

702. What is the standard practice in regard to the operator ringing on a trunk circuit with which she is making a connection. Describe the operation of the trunk circuit shown in Fig. 216.

703. What are the disadvantages of such a recording trunk circuit? Explain why the ring-up lock-up type of double-wound relay is very apt to be unsatisfactory in service.

CHAPTER XXV. The Non-Multiple Toll Switchboard (Concl'd).

704. *Switching toll line circuits.*—In the class of telephone offices suitable for non-multiple toll switchboards, adapted for the simple toll trunk circuits that have been considered, the toll line circuits are often switched from the toll switchboard to the local switchboard during the night or other periods of light toll traffic. At such times the local operating force is sufficient to handle both the toll traffic and the local traffic with corresponding economy in operators' salary expense.

When this plan is followed, it is necessary, obviously, that the local position to which the toll line circuits are switched, be provided with toll to local cord equipment. The actual number of such cord circuits that must be provided, however, is much less than the number required on the toll switchboard, owing to the lighter traffic handled.

705. *Arrangement for switching toll line circuits.*—The method of arranging the toll line circuits to permit of switching them in this way is shown in Fig. 217. Both sides of the toll line circuit are taken through the contacts of a six-spring plunger-type key before they pass to the toll switchboard. With the key in normal position the toll line circuits terminate on the toll switchboard in the ordinary line equipment, consisting of the signal and jack.

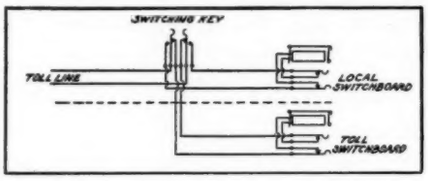


Fig. 217—Method of Switching Toll Line

At the proper time, which may be at night, on Sunday, or on a holiday, the local operator depresses the key button, switching the toll line circuit to another similar line equipment mounted on one of the local switchboard sections. The operation of the switching key entirely removes the regular line equipment on the toll switchboard from the toll circuit and substitutes for it the similar line equipment found on the local switchboard.

This insures that only one line signal is connected to the toll line circuit at one time and eliminates the transmission losses that would result from a mere duplication of line equipment on the one circuit. In fact, since the special local position must be provided with the proper kind of cord equipment, the all-important feature of transmission efficiency is not affected in the least by the change from the regular line equipment on the toll switchboard to the special equipment on one of the local switchboard sections. At the proper time the toll lines may be switched back again to the toll switchboard by restoring the switching keys to normal.

706. *Keys for switching toll line circuits.*—The switching keys used for this purpose have been practically standardized in one form by all switchboard manufacturers. They are mounted in strips similar to jack strips and on the same horizontal centers, so that they may be placed in close association with their proper line jacks in the apparatus space of the local switchboard section. In this way the liability of error, due to switch-time, is removed. Each key controls the line circuit, whose line jack is immediately above or below it.

CHAPTER XXVI. The Multiple Toll Switchboard.

707. *Basis for classification of multiple toll switchboard equipment.*—While it is true that the non-multiple type of toll or long distance switchboard, in point of the number in service, is the more important class, in point of the amount of traffic handled the multiple toll switchboard is probably of far greater consequence.

It is extremely difficult to select a definite feature of design or equipment that may be used as a basis for the proper classification of such toll switchboards. The line signals in use in any given installation may be the manually-restored drop, the self-restored drop, the electrically-restored drop, or of the lamp-signal type.

The cord circuits on the toll switchboard may be arranged to supply the transmitter-operating current for the local telephone circuits on long distance to local connections, or they may be designed for operation with trunk circuits in which this function is delegated to the trunks.

For these reasons, satisfactory classification of multiple toll switchboard equipment is very difficult and individual installations embodying special features become of the greatest interest.

The most practicable basis for a classification of multiple toll switchboards is in the character of line signal employed. This may be a drop, a lamp, or a combined drop-and-lamp arrangement.

708. *Toll line signals.*—The pure drop-signal toll-line equipment is merely an adaptation to toll service of the magneto line equipment employed in local magneto offices. When the drop-signal toll switchboard is of the multiple type, the line equipment is of the same design

as multiple local magneto line equipment.

There is no difference in the equipment itself whether employed in local or in toll or long distance service. Such line equipments may be of the series multiple type or of the cut-off relay multiple type. See sections 342-345, TELEPHONY'S Home Study Course for Telephone Men, March 18, 1917. The more modern equipment is generally arranged for the cut-off relay method of wiring and operation.

The busy test in any given instance, which is always essential to the operation of multiple telephone equipment whether local or toll, may also be of either one of two different general types In very many toll switchboards the busy test is an audible one which is exactly similar to that found in local magneto multiple switchboards.

In the most advanced installations, the busy indication is of the visual type. This is true of switchboards employing the ordinary manually-restored drop type or the self-restored drop type of line signal as well as of those in which the lamp line signal only is found.

709. *Importance of thorough protection of busy toll circuits.*—The extreme importance of the proper design of the busy indication for the line circuits in toll switchboards is very apt to be underestimated. Owing to the relatively high rate that must be obtained for service given over the enormously expensive long distance circuits, any interference with their maximum profitable exploitation is to be prevented at all costs. Therefore, should the equipment be so designed as to prevent the intrusion upon a circuit on which an unanswered but recently received call is awaiting the operator's attention, it would insure that toll traffic once tendered to the circuit would be free from unwarranted delay and obstruction.

In local service, the thorough guarding of the busy circuit is not so important for two reasons. The service cost is not so high, due to the lower expense chargeable to the shorter and simpler local circuit, and the obstructed call is almost sure to be renewed. In long distance operation, on the other hand, many calls that cannot be promptly completed are lost to the telephone company. This is especially true in exchanges confronted with vigorous competition and with parallel competing toll plants.

Such thorough guarding of busy toll circuits is somewhat simpler in the case of lamp-signal toll-line equipments than it is in the case of drop-signal toll-line equipments.

This is because the line relay of the lamp-signal line equipment, which is actuated in one way or another by ringing current over the toll circuit, may be arranged to operate the busy signal at the same time that the associated line-lamp signal is displayed. In other words, the line relay spring contacts not only close the energizing circuit of the line-lamp signal, but they also close the energizing circuit, at the same time, of the busy signal.

Once operated, the busy signal may be retained in its displayed position after the call has been answered and during the continuance of the resulting talking connection with its associated line circuit. There must be, of course, a busy signal, in such installations, for each multiple jack of each toll line. Such thorough guard of busy toll line circuits is another means of conserving, to the greatest possible extent, the active paying employment of long distance circuits.

710. *Division of multiple toll switchboard equipment.*—Operators employed on modern multiple toll switchboards may be divided, on the basis of their different duties, into two classes—recording and line-position.

Calls from local subscribers who desire to obtain outgoing service over the toll lines, are handled on the toll switchboard by recording operators. The recording positions are distinct from the line positions and are somewhat differently arranged. Ordinarily no connections are completed with the toll or long distance circuits at the recording positions.

The toll terminals of the recording trunk circuits leading from the local switchboard, are found on the recording positions. In addition, there are information trunks which lead to an information operator's position; interposition trunks which lead to each of the other positions of the switchboard; order-wire circuits; toll to local combination or universal cord pairs; and pigeon holes for the storage of toll tickets and other record forms.

711. *Duties of recording operators.*—The recording operator answering the signal displayed on a recording trunk, makes a record of the data required by the line operator, the accounting department, and the subscriber, and passes the ticket to the line operator for execution.

Recording operators, therefore, deal directly with the telephoning public and with properly designed and arranged equipment they are a help to the company in retaining the patronage of the public for toll lines confronted with strong competition. Since their duties comprise the making of numerous individual written records, sufficient space for writing must be provided on the keyboard portion of the switchboard sections.

712. *Division of multiple toll switchboard equipment, line positions.*—Calls arriving over the toll or long distance lines are answered by the line-position operators. The tickets received from the recording operators are also executed by the line operators, connection with local subscribers' circuits being obtained over service toll trunk circuits which terminate in multiple jacks on the line positions of the toll switchboard.

The toll operator, according to the most prevalent practice, asks for a trunk assignment for making connection with a local line, and completes the connection between the service toll trunk circuit and the toll line circuit by using one of the cord pair on her position. This is true, as has been pointed out in the foregoing, whether the call originates in the local exchange or is received from a distant exchange over a toll or long distance circuit.

The line operator must also "build" circuits by calling intermediate offices for connections that may not be made direct. This portion of her duty calls for a surprising knowledge of circuits, routes, transmission conditions and other offices. It is also a part of the line operator's duty to supervise the established connection and remove the cord plug from the toll circuit as soon as possible in order to release it for another possible waiting call.

When required to do so, the operator on the line sections of the toll switchboard must also connect toll lines together in order that the toll operator in a distant office may "build" the circuit for an office only to be reached indirectly.

[EDITOR'S NOTE: In repeating Fig. 214 in TELEPHONY of last week, which shows the simple recording trunk circuit for two-wire multiple local equipment, the operation of which was described in the issue of June 16, the printers made a transposition of cuts. The circuit presented in Fig. 214 is in reality the circuit of Fig. 215, and vice versa. If the titles of these two cuts are transposed, the text matter descriptive of Fig. 215 will read correctly.]

Operators Hold Spelling Match on New Rule Book.

An interesting variation on the usual course of meetings of operators and plant employes was arranged at a recent meeting of the employes of the Paducah (Ky.) Home Telephone & Telegraph Co. This was a spelling match, for which two of the employes chose sides. The words given for them to spell were taken out of the new book of operating rules. Miss Ruby McCullen, toll operator at Paducah, was runner up, while Mrs. Gertrude Cook, chief operator at Mayfield, and Miss Pearl Goodman, bookkeeper at Mayfield, were able to spell correctly every word that was given to them.

Minor Corman, superintendent of the Central Home Telephone & Telegraph Co., addressed the plant and equipment men, and Warren M. Paine, assistant superintendent of the Central Home, and B. Y. Chambers, district manager, addressed the operators' meeting.

Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchises, Rates and Service

Hearing on Birmingham, Ala., Rate Case Begun.

Hearing on the petition of the city of Birmingham for a reduction in the telephone rates of the Southern Bell Telephone & Telegraph Co., was begun by the Alabama Public Service Commission at Montgomery on June 13. Dameron Black, of Alonzo Richardson & Co., public accountants, of Atlanta, was the first on the witness stand. He said that he was convinced from a three months' inspection and investigation of books and charges of the Southern Bell company, that the rates in Birmingham were excessive. Mr. Black produced a large record of his investigations, showing the costs of operation, receipts and all things entering into the company's business in Birmingham. He declared that he did not believe the company's books correctly showed the profits from the service in Birmingham. He did not charge that the company had ulterior motives in covering up its receipts, but declared that the books were so kept that many charges made against the company's Birmingham service should be charged to other sections, while some receipts credited to the Birmingham section should go to another.

Mr. Black was appointed examiner of the company's books by the public service commission and began work in November, completing the task about February 1.

M. M. Ullman, city attorney of Birmingham, and James Weatherly, member of the Birmingham commission, represent the city, while the telephone company is represented by J. Hunt Chipley of Atlanta, General Counsel J. Q. Smith of Birmingham and Robert E. Steiner, Jr., of Montgomery.

In going into details about the proper charges for the service in Birmingham. Mr. Black said the charge for an extension telephone for business use should be $12 instead of $18, and the charge for an extension in the home should be $6 instead of $12.

Testimony was presented at the second day's hearing to show the value of the company's property and other physical facts relative to its valuation.

Nebraska Patrons May Be Required to Pay for All Removals.

The question of compelling the subscriber to pay outright the cost of every removal of any sort is being considered by the Nebraska State Railway Commission. Chairman Hall, who has made an investigation and study of the matter, is outspoken in favor of doing so, but has not yet secured action thereon by his colleagues.

Mr. Hall argues that the subscriber who keeps his instrument in one location year after year should not be required, as he actually does under the regulatory system, to pay a part of the cost due to the whimsicality or the nomadic tendencies of other subscribers. Under the usual practices, companies are permitted to make a charge of $2 for such service, but they are required to absorb this during the year if no further removal is ordered or necessary. Mr. Hall insists that each subscriber should pay for whatever service he asks, and foot whatever expense the company is put to in obeying his orders.

Within the last few months the commission has been requiring each company that had rate matters before it to adopt a standard tariff for removals. Removals have been fixed at $2, although the new tariff of the Bell company makes the charge of $1.50 for removals within the base rate area.

Commission to Ascertain Rates of All Nebraska Companies.

The Nebraska State Railway Commission has been sending out blanks to all telephone companies doing business in the state, requesting that they be filled out with rates now in force, and being collected, together with tariffs for all service offered but not given.

This course has been found necessary because of the fact that a number of the smaller companies have changed their tariffs without going through the legally required formality of first securing the approval of the commission. Most of them were unaware that this was required of them, while others proceeded on the theory that the changes were so slight that it was a waste of time to make application and a showing of necessity or desirability. The commission found out that this was being done through investigations made necessary by complaints of service, etc.

Blanks were sent out last in 1909, when the commission was first organized for this work. The figures in the new blanks are carefully compared with the old records, and where a variance is shown the companies are required to make formal application for validation. In the last week the Farmers' Telephone Co., of Dodge, and the Platte Valley Telephone Co., were found to be delinquents in this respect, and they were compelled to make application.

A Typical Small Town Rate Situation.

That the telephone business in the smaller towns is resorted to purely for health reasons, in a number of instances, is the belief of one member of the Nebraska State Railway Commission, after recent experiences and investigations.

The Hoskins (Neb.) Independent Telephone Co. applied for an increase of from $3 to $4 a year for switching charges. The financial statement showed gross revenues for last year to be $1,239 and expenses $1,215. This left nothing for interest or for depreciation. Two girls at $30 a month each were employed, while the lineman got $10 a month. Other wages paid were in the same meager proportion. The commission granted the application without further notification, subject to complaint.

Connersville (Ind.) Rate Case to Supreme Court.

A motion for a new trial in the case of the Connersville Telephone Co. against the Indiana Public Service Commission was overruled by Judge Sparks at Rushville, Ind., on June 9. An appeal to the supreme court was granted. The court granted an injunction against the enforcement of rates established by the commission for the telephone company.

Preparations Under Way to Revise Chicago Rates.

The Chicago council committee on gas, oil and electric light is making preparations for an investigation of the business of the Chicago Telephone Co. in order to fix new rates for the next five-year period, which begins in July, 1918. Edward W. Bemis, the committee's utility expert, estimated that it would cost about $86,000 to make the investigation.

Approval Given to "Junk" Chicago Automatic Equipment.

The committee on gas, oil and electric light of the Chicago city council, on June 22, voted to accept $200,000 as compensation from the Chicago Tunnel Co., for permission to "junk" its automatic telephone equipment. The company is given six months in which to make payment.

General and Supplemental Tariff of Nebraska Telephone Co.

The Nebraska Telephone Co. has filed with the state railway commission a voluminous general and supplemental rate tariff, for approval before being printed. A part of it covers practices and rules

in force in the past, and a part is new. The experts of the commission are now engaged in checking up the two tariffs.

Business rates apply, in addition to recognized classification, where telephone is in residence adjoining place of business that has no telephone; where the trade or profession of the subscriber is indicated by the listed title; in offices of administrator of schools, hospitals, charitable societies, offices of fraternal societies and clubs.

Residence rates shall apply to instruments installed in dwellings, homes of medical practitioners, who also subscribe to business service, residence of clergyman, or where title indicates profession. They also apply in churches and pastors' studies, in schools except in office of administrator; in private stables or garages that are part of domestic establishment and college fraternities, where members are housed and which are not in constant use as clubs.

It is stipulated that where rates for four-party service are quoted it shall be sold only when it is evident that not less than three persons can be secured on a given line. When it drops below three, and after a reasonable effort has been made to secure additional subscribers, and they cannot be found, the remaining subscribers must make up the difference between what they are paying and the full amount the line should earn, or be transferred to another service.

Employes are given a 33⅓ per cent. discount for service furnished.

Farm line service will be furnished on lines containing not less than eight subscribers, and upon contracts for from three to five years. Managers may accept contracts for a shorter period when there is no additional expense for installation at rates specified in the exchange tariff, except that when excessive new construction is required, the subscriber shall be requested to contribute toward the cost of building, if the cost is excessive, as compared with the revenue the company is to receive.

When a new pole line is constructed on the public highway, it shall be provided at the subscriber's expense, and ownership shall vest in the company; where built on private property it may belong to either. Only wall equipment will be furnished rural subscribers; no desk sets will be provided. The standard charge for moving shall be $1.50 within the base rate area; outside of that at actual cost.

All short-time contracts shall be proportional to the yearly rate, plus the installation and removal cost, with a minimum of one month's service. Extension bells or gongs will be furnished at 25 cents a month extra, with an installation charge of $5.

Other provisions in the tariff sheet cover the various other activities of the company, comprehensive rules as to listing being provided, and rates and service for P. B. X., and interior systems, exchange stations, joint user charges and the like.

Interchange of Toll Service Asked in New Hampshire.

The petition of the Henniker Telephone Co. of Henniker, N. H., that the Contoocook Valley Telephone Co. be ordered to exchange service in Henniker, Hillsboro, Warner and Deering, was heard on June 8 by the New Hampshire Public Service Commission.

The petition is the first brought under an act of the legislature of 1917 giving the commission power to order interchange of service. Counsel for the Contoocook company claims that the law did not contemplate such action as the Henniker company seeks.

The Henniker company is a local mutual concern, while the Contoocook company has long distance connection with the New England Telephone & Telegraph Co., with which it is affiliated. The Henniker company asks for the same connections through the Contoocook company, while the latter claims that this would be giving an undue advantage to a competing company.

Judge James W. Remick appeared for the petitioners; Allen Hollis for the Contoocook company, and Matt B. Jones and George R. Grant of Boston for the New England company. Decision was reserved.

Telephone Ordered Installed at Old Home Rate in Spokane.

An order requiring the Home Telephone & Telegraph Co., of Spokane, Wash., to install and maintain a single party telephone service for $2 a month was signed June 19 by Superior Court Judge Huneke of Spokane county. The order was result of a suit brought by Harvig Ellerton, a taxpayer and citizen of Spokane, brought as a test by Corporation Counsel J. M. Geraghty of Spokane, who gave his services to Mr. Ellerton without charge.

The suit demanded the $2 single party line rate provided in the franchise granted the Home company in 1905. In 1915 the Home company purchased the plant of the Pacific States Telephone & Telegraph Co., which had been operated in Spokane by the Bell interests, after they had acquired control of the Home company stock.

Another case was disposed of by Superior Court Judge Hurn, in which the city of Spokane is seeking to have the franchise of the Pacific and Home companies cancelled. Judge Hurn ruled that the superior court had no jurisdiction, and the case should be tried in the federal court.

Judge Hurn holds the matters in controversy are of an interstate nature, and affecting persons of various states. The matters in dispute also exceed $3,000 in value, he says, which makes it further a matter for the federal court to pass on.

The action was started some time ago by the city, which contended that the Pacific company has been put out of business in the city because it has no valid charter, and the Home company franchise should also be cancelled and held void because it is a part of the Pacific company.

This case, when it was brought in the federal court for the eastern district of Washington, was thrown back to the county court by Judge Frank Rudkin.

A third action is now pending before Judge Rudkin in which the Bankers Trust Co. of Los Angeles, owners of the Home company bonds, ask an injunction to prevent the city of Spokane attempting to cancel the Home company's franchise. Arguments were heard June 18 and the matter taken under advisement by the court.

A fourth action is before the Washington state public service commission, by which the telephone company hopes to get state authorization to charge the higher rates of the old Pacific company, despite the fact that it is operating under the franchise of the Home company which guarantees the $2 monthly single party line charge.

Oak Lane - Melrose Telephone Complaint Dismissed.

The Pennsylvania Public Service Commission has refused to order the Bell Telephone Co. of Pennsylvania to revise tolls in the Melrose suburban district to conform with those in the Oak Lane district. This decision was rendered in a complaint filed by Mrs. Anne T. Scribner, of Melrose.

Oak Lane, being within Philadelphia county, is within the free zone for telephone subscribers in that city. Melrose, which is in Montgomery county, must pay tolls on calls to the city. If talking to Oak Lane, for example, the Melrose subscriber must pay 5 cents even though the Oak Lane subscriber is just across the road.

The public service commission ruled that in the telephone business, zone lines must be established some place, and says it can find no cause to interfere.

Summary of State Commission Hearings and Rulings.

CALIFORNIA.

June 12: Home Telephone Co. of Covina authorized to issue $6,500 6 per cent. first mortgage refunding gold bonds at par net, and to use the proceeds to increase its cable capacity and extend its toll and wire lines to care for increasing business. The company has three ex-

A Grabaphone for Every Telephone Service

Telephone Service is made better as it is made simpler, as lost motions are done away with and unnecessary apparatus is discarded.

The act of telephoning is the more attractive when you get your party with the minimum of exertion, physical and mental.

In early telephone days considerable gymnastic effort, both of muscle and brain, was usually necessary for a successful conversation.

Each succeeding improvement of the telephone brings the talking parties nearer together in the easiest way.

To the present time perhaps the desk stand is the most convenient telephone apparatus. Now the sensible, practical and efficient Kellogg Grabaphone further dispenses with a vast amount of effort required in the act of telephoning.

The right or left hand is always free, for writing, for instance.

When you want to telephone; from any position, standing, sitting or reclining, the subscriber can

"GRABAPHONE!"

and talk, with the slight movement of one arm, and that is all. No need of holding a desk telephone in one hand and a receiver in another. No need of balancing a portable telephone on an arm chair and straining one's neck, to complete the connection, or of leaning awkwardly over inkwells and papers, at your desk in a distracting way.

With the Kellogg Grabaphone giving excellent transmission the subscriber can be standing in a hallway, sitting at a desk, reclining in a Morris chair or resting peacefully in bed, and a quiet, clear conversation is not only possible, but is always a certainty.

Kellogg Grabaphone is the ultimate telephone efficiency for the subscriber, and the last word in practical apparatus for the manager. Whether this subscriber lives in a palace or is a tradesman on a side street, we have a Grabaphone adapted to his particular service.

All of Kellogg Grabaphone equipment and circuits are standard and are identical for the service required with our unequalled desk stands in both magneto and common battery exchanges.

The Grabaphone offers a unique service in towns where competition is a consideration, in that subscribers once using this instrument vastly prefer it in many cases to the standard types, and especially preferred as compared with the semi-obsolete equipment offered by competitors.

The Kellogg common battery Grabaphone is as efficient as is our famous No. 97 induction coil condenser desk stand, likewise the Kellogg local battery Grabaphone has the same efficiency as the well known Kellogg magneto telephone circuits. The Kellogg Grabaphone is 100% efficient.

The receiver shell, the handle, the transmitter and the mouthpiece are of heavy Kellogg Bakelite; indestructible in ordinary telephone service. Repeated and long continuous tests prove telephoning with Kellogg Grabaphones equal to any service over desk stands or wall apparatus.

The Kellogg Grabaphone has a particular appeal to people of refinement and wealth.

But above all, it is, to the telephone manager, a means to increase his business and a surety of the highest class service.

Order two or more styles of Grabaphones today. Try them out in every way, and the truth of the arguments here presented will appeal to you.

Use is the Test

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

You have no idea what a money maker this set is, especially if you have competition, until you try a few—as extension sets.
Order—just one—today. Ask for No. 111 stand, with No. 11 L. C. Grabaphone.

KELLOGG SWITCHBOARD & SUPPLY COMPANY

CHICAGO, ILLINOIS

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

changes in Covina, Azusa and Pusne, with a total of 1,740 subscribers. Its system is connected with toll service through its Covina exchange only. The company wanted permission to sell its bonds at not less than 95 per cent. of par but in view of its earnings the commission decided that it should receive par.

June 15: The Southern California Telephone Co., the Home Telephone & Telegraph Co., and the Pacific Telephone & Telegraph Co. asked the commission for authority for the Southern company to issue to the Pacific company $786,000 capital stock for approval of the delivery by the Southern company to the Home company of $355,000 bonds and for permission for the Pacific company to acquire from the Southern $786,000 of the latter's stock. The consolidation of the properties of the Home and the Pacific companies in and about Los Angeles was sanctioned by the commission some months ago, as was also the acquisition by the Southern of the joint properties.

IDAHO.

June 18: Camas Prairie Telephone Co., of Fairfield, ordered to remove discrimination in charging stockholders a lower rate than that of other patrons.

ILLINOIS.

May 21: The reorganization committee of the Western Illinois Telephone Co. is granted by this order authority to sell to the Plymouth Farmers Switchboard Co. for the sum of $1,000 cash all the property of the reorganization committee lying within the corporate limits of the village of Plymouth, except one certain main toll line running through the village, together with the right of way therefor and the right to maintain and operate same in the village of Plymouth.

Commission also orders that the property to be acquired by the Plymouth Farmers Switchboard Co. shall never be capitalized in an amount exceeding $1,000; that upon the completion of the purchase the Plymouth Farmers Switchboard Co. shall make a verified report to the commission. No. 5675.

May 28: The commission approved an intercorporate contract between the Chicago Telephone Co., of Chicago, and the McHenry County Telephone Co. of Marengo, Ill., dated April 24, 1917, which provides for the switching by the McHenry County Telephone Co. through its Marengo switchboard of messages coming from and destined to points beyond Marengo, passing over certain circuits of the Chicago Telephone Co. extending from Marengo to Belvidere, Ill., and other circuits of the Chicago Telephone Co. now connected with the Marengo exchange.

The commission expressly reserves jurisdiction of the subject matter for the purpose of making either upon its own motion or upon complaint, any change in the terms of said contract that may at any time become necessary. No. 6767.

May 28: The Bond County Telephone & Telegraph Co. is ordered to resuspend its schedule No. 1 proposing to advance its telephone rates for certain classes of service in Greenville until November 28, 1917, in order to allow the commission time to continue its investigation concerning the propriety of the proposed rates. No. 5299.

May 28: Authority is given to F. C. Orton, of Lincoln, Ill., to sell to the Macon Telephone Co., a corporation of Macon, Ill., all the telephone property now owned and operated by him in the village of Macon and vicinity under the name of "Macon Telephone Co., unincorporated," for the consideration of $18,000 to be paid in cash; the transfer to be completed within 60 days and immediately thereupon F. C. Orton to file a certificate of discontinuance of the telephone plant.

The Macon Telephone Co., a corporation, is granted a certificate of convenience and necessity to acquire and operate the telephone property in the village of Macon and vicinity referred to. The Macon Telephone Co. is also given authority to issue its common capital stock to the amount of $4,000, its preferred stock to the amount of $8,500, and its first mortgage loan 6 per cent, gold bonds to the amount of $12,500, bearing date January 1, 1917, and maturing serially one bond each second year from January 1, 1922, to January 1, 1936, inclusive and the remaining bonds, 17 in number, on January 1, 1937. The proceeds of the sale of the capital stock and securities so issued to be applied as follows: For the acquisition of the telephone plant, $18,000, and for the construction, extension and improvements to plant, $7,000.

The Macon Telephone Co. is also authorized to execute a deed of trust as of date January 1, 1917, to R. H. Woodcock as trustee all its property to secure the issue of $12,500 bonds. No. 6274.

May 29: The Farmers New Era Telephone Co. is ordered to suspend its schedule No. 1 proposing to advance its telephone rates for certain classes of service in Spring Grove until September 28, 1917, in order to allow the commission time to continue its investigation concerning the propriety of the proposed rates. No. 6829.

May 29: The commission approved an agreement between the Chicago, Burlington & Quincy Railway Co. and the Chicago Telephone Co., covering the relocation and maintenance of nine telephone poles on the right of way of the railroad company, south of West 22nd street and east of Morgan street (produced) in the city of Chicago. No. 6559.

May 29: The commission approved an agreement between the C. C. C. & St. L. R. R. Co. and the Peoples Mutual Telephone Co., of Hillsboro, Ill., covering a wire crossing to be constructed over the right of way and tracks of the C. C. C. & St. L. R. R. Co. at the east end of Middleton street in the village of Witt, Ill. No. 6645.

June 26: Hearing at Springfield in the matter of the application of the Sparta Telephone Co. for authority to change rates at Sparta, Ill. No. 5320.

June 26: Hearing at Springfield on the application of the Sparland Telephone Co. for an order authorizing the issue of $1,000 of its common capital stock and $3,500 of its preferred capital stock and of $5,500 of its first mortgage 6 per cent. gold bonds and authorizing the execution of its deed of trust upon all of its property and assets to J. L. Jones as trustee. No. 6863.

MONTANA.

June 19: Petition of Eureka Mutual Telephone Co. for a hearing at which it will present arguments asking for the privilege of raising its rates.

NEBRASKA.

June 20: Complaint of residents of Taylor as to toll service on Ord Telephone Co. lines; toll service is attempted over line that has 16 telephones attached; showing ordered.

June 20: Complaint of Mrs. C. S. Olson that Nebraska Telephone Co. refuses to furnish four-party service on Fremont exchange; ordered to show cause.

June 20: General and supplemental tariff of Nebraska Telephone Co.; held for approval.

June 21: Application of Wyoming & Nebraska Telephone Co. for permission to increase rates 25 cents per month on Valentine exchange, to be rebated if paid by 15th of month; showing ordered.

June 21: Application of Nebraska Telephone Co. for permission to cancel farm rate on Elkhorn exchange and to cancel four-party rate on St. Edward exchange; placed on file.

June 21: Application of Farmers Telephone Co., of Dodge, to validate rates established without approval by commission; granted.

June 21: Application of Platte Valley Telephone Co. to validate rates on exchanges from Bayard to Morrill, established without permission; filed.

June 22: Complaint of Wilson Hunbine that Nuckolls County Telephone Co. gives improper service on lines between Ruskin and Oak.

NEW JERSEY.

July 3: Postponed hearing of argument in the matter of fixing rates for service by the New York Telephone Co. and the Delaware & Atlantic Telephone & Telegraph Co.

OHIO.

June 17: Protest filed against the valuation of the Cleveland property of the Ohio State Telephone Co. as fixed by the state public utilities commission by City Law Director FitzGerald and Assistant Law Director Woods.

In the opinion of the city representatives, the overhead charges allowed by the commission are too high. The telephone company already has filed a protest that the valuation is too low.

The commission has placed the valuation at $3,884,778. The company claims that its property is valued at $5,929,737. There will be a hearing at Columbus in the matter July 24.

PENNSYLVANIA.

July 17: The commission dismissed the complaint of the Slate Belt Telephone & Telegraph Co. that the Blue Mountain Telephone & Telegraph Co. has secured control of the Warren Telephone Co., a New Jersey corporation operating in Easton, without securing a certificate of convenience and necessity.

Both the companies operate in Northampton county and it is declared in the opinion that there is no proof of direct acquisition and that no money of the respondent company was used in the purchase, but that men interested in the company bought stock in the Warren as private individuals. This condition, the claimant contends, formed "indirect control, but the opinion says the evidence does not disclose any such intention in the case.

"It would be a most hazardous proceeding for one corporation to attempt to secure control of another by procuring the purchase of its stock by an individual in his own name and without any agreement or undertaking to transfer such stock to the company," says the opinion. "For there would be nothing whatever to keep such individual from retaining such stock for his own benefit."

UTAH.

June 15: Granted Mountain States Telephone & Telegraph Co. permission to install an instrument at the soldiers' club in Salt Lake City without making any rental charge for its use.

WEST VIRGINIA.

June 13: Complaint of R. H. Roberts against the Chesapeake & Potomac Telephone Co., relating to alleged inadequate service; dismissed.

British Colonial Telephones

Abstract of Paper Presented Before Institution of Electrical Engineers and Published in The Electrician — Telephone Systems in the Crown Colonies, South Africa, Canada, Australia and New Zealand—Final Installment

By R. W. Weightman

There are many types of iron brackets and arms available for use with iron poles, and South Africa may take some credit for having helped to evolve a number of useful improvements to these fittings.

The bracket shown in Fig. 2 is of malleable cast-iron. It is typical of many other patterns which vary mainly in the size of the seat.

For a wood arm, Jobson's combination bracket is a useful fitting. This was originally made with straight fixing bolts, and it is still used in this form by some administrations.

In South Africa it gave much trouble owing to the arm shrinking in dry weather and causing the clamp to become loose. On angle poles this often allowed the arm to cant and even to twist right around. To prevent this and to enable the clamp to be tightened upon the pole independently of the arm, the author's old chief in Natal, the late T. T. Hardaker, devised the shoulder bolt shown in Fig. 3.

With the introduction of the tubular iron arm by the post office in England several of the colonies quickly took it up, and with some of these it is now the standard arm. The spacing between insulators and arms is somewhat varied in the different colonies.

When the author adopted tubular arms in Natal, he designed and introduced a number of fittings, such as tie rods, arm supports, cross arms, back braces and cage frames. Where wires are terminated on an 8 or 12-wire arm, the arm is back-braced. The end of the pole arm is sometimes scalloped to take the cross arm,

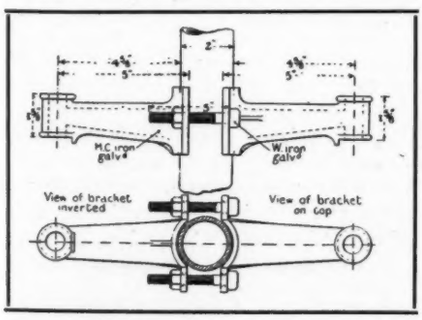


Fig. 2. Double Bracket of Wrought-Iron Pole.

which is held in position by means of an eye bolt. The head of the eye bolt is slipped inside the main tube, and is held by the first insulator spindle on it.

Where the end of the pole arm is not scalloped a cross arm holder is used. Where 8 or 12-wire cross arms are used, they are back-braced to the pole arm by means of two strands of 7-16 steel wire (galvanized) each with a small swivel tightener.

A four-sided tubular iron frame is used on a junction or leading-in pole carrying wires in four directions. These frames are built up in the form of a cage and the design is such that the lineman has plenty of elbow room.

The sizes of tubular arms most commonly used are all 1-11/16 ins. diameter by Nos. 7, 9, and 12 S. W. G. thick. They are always galvanized. Tests show that the No. 9 gauge tube is sufficiently strong for all practical purposes.

If line construction is good, the maintenance costs will be low, and the great advantage of freedom from faults is gained. Probably in no other class of engineering is the success of a work dependent upon factors of such low values mechanically as in telegraph and telephone engineering.

Double-shed white porcelain insulators of post office types are generally used in the Crown colonies and in South Africa. On the farmers' lines in South Africa, a small single-shed porcelain cup is used. The spindles and cupholders used with these cups are generally of the standard types adopted by the British Engineering Standards Committee, although for light conductors single and double J and also U cupholders of lighter patterns are used.

Glass insulators so much used in the United States and Canada, where the climate is dry, are not used to any extent in the Crown colonies, and not at all in South Africa. Some insulation tests of porcelain and glass insulators of the same size and shape gave an average of 50,000 megohms for the former and 3,500 for the latter.

Glass insulators are much affected by changes in temperature and are liable to fly to pieces even when these changes are comparatively slow. Porcelain insulators are less affected by temperature changes, and when used in the standard manner on screwed spindles with elastic washers of felt or India rubber, are quite reliable. The insulation of a line is a matter of the first importance.

The best insulator gives the best service, and the author is prepared to say that no insulators made are to be compared either for insulation, strength, or general serviceableness with the British post office standard porcelain types as made in England.

The arms generally used in Canada

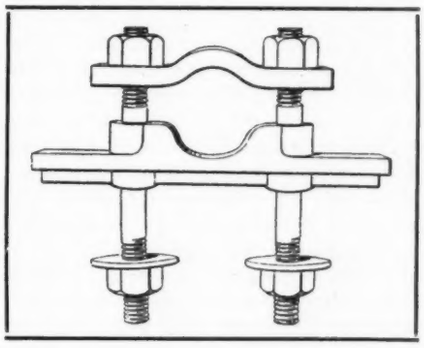


Fig. 3. Combination Bracket with Shoulder Bolts.

are of British Columbia fir. A 6-wire arm used by the Grand Trunk system, is 7 ft. long by 4½ ins. by 3½ ins. On telephone lines 6 and 10-wire arms are used, but the 10-wire arm is the general standard. The spacing is usually 12 ins. between cups, with 18 ins, at the pole, and the arms are generally spaced 24 in. apart.

Both porcelain and glass insulators are used on both telegraph and telephone lines; but, owing to the wonderful dryness of the climate, glass is found to give sufficient insulation. Where high insulation is required, percelain is used.

In Australia wood arms and single iron brackets are used on both wood and iron poles. They are usually of 3 ins. square section with the edges chamfered. The standard lengths vary from 42 ins. for 4 wires with 9-in. spacing to 96 ins. for 10 wires with 9-in. spacing.

The standard insulators used are of porcelain or stoneware of double-shed type and made in two sizes. They are threaded internally and are usually carried on wood pins similarly threaded, although iron spindles with lead-screw tops are also used.

The "cheaply constructed line" is a novel feature authorized by the commonwealth department. Such a line is only erected when the cost of a standard pole line is prohibitive. It is erected on trees, saplings, scantlings and fences. Owing to the low efficiency of the insulation, this class of line is used almost exclusively for local telephone services. Where the wire is attached to a tree, a sling insula-

tor as illustrated in Fig. 4 is used. Where the wire is carried on fencing posts, barrel insulators of the same type are employed.

The question of pole arms is a vexed one in New Zealand, owing to the scarcity of suitable timber for the purpose. The arms in use are mostly of Rata wood, which is hard and suitable in every way, but difficult to obtain. The insulators used are of standard post office, white porcelain types. Iron arms are not used. Insulators made from a black composition have been tried, but have not given satisfaction.

Line Wire.

In the Crown colonies and South Africa galvanized iron wire is not so much used now, although for minor telegraph circuits 200-lb. and 400-lb. wires are still employed considerably.

For long distance telegraph lines 150-lb. and 200-lb. copper wires are used. Practically all telephone circuits are of copper. In South Africa 70-lb., 100-lb., 150-lb., 200-lb., 300-lb. and 400-lb. gauges are used according to the grade of service required. The telephone trunk wires are generally erected on the twist, and on main lines. As a matter of economy both telegraph and telephone circuits are erected on the same poles. In cases where separate pole lines are erected for telephone circuits the wires are transposed on U-cupholders.

Bronze wire, usually 150-lbs. per mile, is employed in some colonies for long spans, but not largely; copper-clad steel wire has also been used to a slight extent. In two colonies where this latter wire has been tried, it has quickly broken down owing to moisture penetrating the copper, probably through defects caused in the handling. Where it is erected near the sea, the life of the wire is very short indeed.

In situations where the insulation of open wires may be lowered from any cause, hard-drawn copper and bronze wire with a special insulation to a post office specification is sometimes used.

The Britannia joint is commonly used for jointing both iron and copper wires, but here and there McIntyre sleeves of both oval and twin tube type have been introduced. The author has all along favored the wire joint, as with native workmen there is less risk with it.

In inexpert hands the sleeve is liable to be badly twisted and the wire damaged. On the other hand, with the sleeve the soldering iron is dispensed with, and this is certainly a great advantage in a country where the work is in skilled hands.

Copper and iron wire are both used largely on both telegraph and telephone systems in Canada.

The open telephone circuits in Canada are transposed. The system of transposition is based on that of the American Bell Telephone & Telegraph Co., and is worked out in a very thorough manner. Phantom telephone circuits, superimposed on physical circuits, are largely used and special transpositions are arranged in these cases.

McIntyre sleeves are employed generally for making joints. On copper wires, copper sleeves, and on iron wires steel sleeves, and also tinned copper sleeves, are used.

There are a few farmer lines on fences in Canada. The fences generally consist of three separate strands of barbed wire on wood posts, the top strand being 15 ins. to 20 ins. from the next. The top wire is used for the line, and it is not usually insulated in any way, but merely

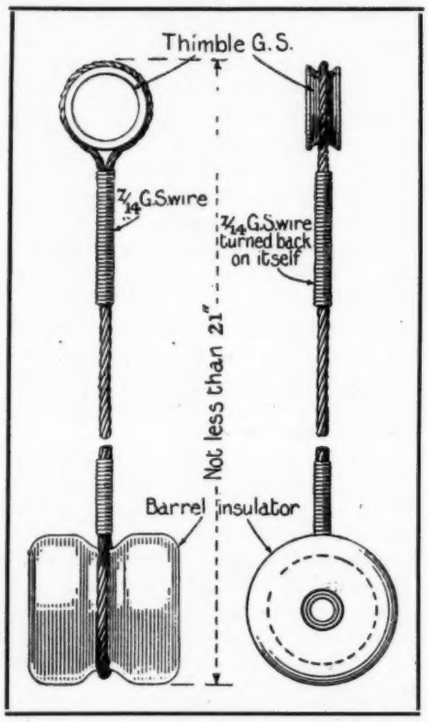


Fig. 4. Barrel Insulator with Sling.

stapled to the posts. The earth is used for the return.

In dry weather no great amount of leakage takes place, but in wet weather the speech-transmission value of such lines is very poor. These lines are not permitted to be joined up to public exchanges.

In Australia for main trunk telephone circuits, copper wire 300 lbs., and 400 lbs. per mile, and for minor trunk circuits which connect with the main trunk system 100 lbs. and 200 lbs. per mile, is used. For other minor trunk lines and also for telegraph circuits, other than those on which fast-speed Wheatstone is employed, 200-lb. and 400-lb. galvanized iron wire is used. For the high-speed circuits, copper wire is provided. Phosphor bronze wire is used for subscribers' circuits on telephone exchange systems; so also is copper wire of 50-lb. and 70-lb. gauges. All joints are made by means of McIntyre or other approved type of sleeve.

Copper, iron and bronze line wire is used in New Zealand. Copper wire of 100 lbs., 150 lbs., 200 lbs., 300 lbs., and 400 lbs. is employed generally for telephone circuits of importance, and also for long telegraph circuits. Iron wire is being less used than formerly. Bronze wire of 40-lb. gauge is used on exchange distribution lines. The McIntyre sleeve is not used, all joints being of the "Britannia" standard type. Fence wires are often used by the farmers for telephone purposes as in Canada.

Throughout the Crown colonies, and also in South Africa, the natives are not sufficiently concerned in commercial pursuits to use the telephone. Statistics do not usually make allowance for this. Consequently the telephone development in these countries does not compare favorably with that of European countries. In almost all these colonies the telephones are in the hands of the government.

In Trinidad the telephones are in the hands of a private company. The principal exchange has a central battery manual multiple board equipped for 1,200 subscribers, with a separate magneto trunk section.

At Suva, Fiji, a multiple magneto board of the "ring through" system is about to be installed. This will have an ultimate capacity of 1,200 lines. The line signal is a plug-restoring-drop indicator, and the clearing signal a circular star-type galvanoscope indicator.

The author is aware that there are objections to the adoption of this system in a large exchange, but he is of opinion that for exchanges in countries where the commercial conditions are not so pressing as in large centers, the "ring through" has its advantages.

At Colombo, Ceylon, a magneto lamp-signaling multiple board is in use, equipped for 1,400 subscribers.

At Hong Kong and Singapore, the local systems are owned by a private company. At both places magneto lamp signal multiple boards with automatic supervisory lamp signals are in use. The ultimate capacity in each case is 5,000. The main cables from the exchange are underground with overhead dry-core cable distribution to open wires.

Obstacles to Automatic.

There are no automatic exchanges in any of the Crown colonies. Not only are insulation difficulties felt to be a bar to their introduction in the damp climates of these countries, but the need for the employment of highly skilled mechanicians to look after the plant is regarded as another obstacle.

The distribution at the larger of these

exchanges is generally by means of cables from the exchange led to pole lines through distribution and protector boxes fixed to the poles. The subscriber density is so low that service by direct cable can be given but rarely. Business premises and dwelling houses are not so cramped as in European towns. They are more open and scattered, so that the direct cable service, or the block and alley system of distribution, cannot be applied to any extent; 10-lb. and 20-lb. conductors are employed.

Where the distribution is by means of armored cable the lead-sleeve joints are usually in cast-iron boxes for protection and to preserve the continuity of the armoring. Where aerial lead-covered dry-core cable is used, it is supported in the usual way on steel suspender wires.

For small exchanges the author prefers the underground armored cable. It can be used with complete safety. The upkeep is practically nil; all the work of erecting suspender wires and the heavy stresses they bring upon the poles are obviated.

The termination of cables in a building usually follows post office practice, the cables being connected to distribution cases by means of a link of enamel and cotton-covered lead-sheathed cable made air tight with beeswax.

Aerial rubber cable has been tried in some of the tropical colonies, but it is liable to break down owing to the heat and rain to which it is exposed.

The pole distribution boxes in use are usually of cast iron, having two compartments, one at the back for the dry-core cable which is sealed up with compound when the paper-covered wires have been soldered on to their tabs. The other compartment is fitted with ordinary carbon dischargers and fuses. The leading-out cables from the pole boxes are single-pair enamel and cotton-covered and lead-sheathed.

Special measurements are taken in the manufacture of all apparatus for use in the hot, humid climate of the tropical colonies to keep up the insulation of all electrical parts, and precautions are taken as far as possible to prevent insects getting inside the instruments.

Development of South Africa.

In South Africa every town and village of any importance has its exchange, and a large long distance system has been developed. At present the longest connections in regular use are about 500 miles in length. A speech efficiency equal to 30 miles of standard cable is aimed at, and intercommunication is given to all stations that come within this limit.

Loading coils have not yet been introduced, but they will be employed when the time arrives to consider the longer long distance lines between the Cape and Transvaal main centers.

The Durban exchange has a central battery manual board, with an ultimate capacity of 7,200. The distribution in the busy area is by dry-core underground cable. Connection is given with other towns in Natal and in the adjacent provinces through the government long distance system.

At the principal government exchanges, central battery manual boards are in use, the largest being that at Johannesburg, with an ultimate capacity of 9,000 lines. Similar exchanges of rather smaller capacity have been installed at Cape Town and Pretoria, and also at about half a dozen other towns on the Witwatersrand.

Magneto Exchanges.

At nearly all other towns magneto boards on the "ring through" system are employed. Magneto boards with automatic clearing are in use at certain exchanges. With this system a condenser is placed in the telephone circuit of the subscriber's instrument. When two subscribers are through, potential is on both subscribers' lines through the supervisory relays. When the telephones are hung up, the loops are closed, the supervisory relays are energized, and the clearing signals operated.

Telegraph circuits are superimposed on telephone wires where it is advantageous to do so, and phantom telephone circuits are obtained wherever possible.

The installing of an experimental automatic exchange was decided upon some time ago, but the war has interfered with this project, as it has done with the telephone development generally in the country. Both wet and dry cells are used on magneto telephones. The author always used wet cells in Natal, as he found them more reliable and economical than dry cells.

The underground cables and distribution methods vary, but the work of coordinating the methods to one standard has now made great headway. In present-day practice, underground cables having 10-lb. conductors are in use. Heavier conductors are employed where required, also composite cables having large conductors for long distance circuits.

Distribution is carried out both by underground direct cable, and on the block system from high poles by means of both dry-core cable and open wires. In both cases the internal distribution is through lead covered cables to distribution frames or cases, and thence to the subscribers' sets. Open-wire distribution is on somewhat similar lines to those already described as in use in the Crown colonies.

The practice of drying out paper cables by means of dry-air pumps fitted with desiccators is followed in some of the Crown colonies, but the tendency now is to adopt the method of jointing described later under Canadian practice. In South Africa portable dry-air pumps are provided for use only when a definite fault appears.

In Canada the Bell company has central battery manual systems in its larger exchanges. In exchanges below 500 or 600 lines, it uses magneto boards. It has no automatic exchanges.

The practice of the Manitoba government department is on similar lines. Its magneto boards are fitted with plug-restoring line signals of the eyeball type.

In Alberta and Saskatchewan, the government exchanges at Calgary, Medicine Hat, Lethbridge, Regina and Saskatoon are equipped with the Strowger automatic system, as is also the municipal exchange at Edmonton. This latter exchange was started in 1907 with a 500-line installation, but it now has 10,800 lines, of which 9,300 are connected. It is spread over four exchanges and an area of roughly 20 sq. miles. All other exchanges in these two provinces are magneto except two central battery manual exchanges at Saskatchewan.

Dry cells are used on all subscribers' magneto instruments throughout Canada.

The block and alley system of distribution is generally followed. The company is working towards an all-cable distribution in its exchange areas. On many small exchanges the main distribution is carried out entirely with aerial dry-core cable.

Protection at Subscriber's Stations.

The methods of protection at subscribers' stations vary somewhat, but generally they conform to American practice. Circuits are divided into three classes — unexposed, partially exposed, and exposed.

Unexposed stations are those that are not exposed to lightning or to contact with lighting or power circuits. A station is not considered exposed to lightning if it is served by aerial wires on poles for a distance of less than half a mile. At such stations no dischargers or fuses are provided.

Partially exposed stations are those that are subject to lightning, but not to contact with lighting or power wires. Carbon dischargers are fitted at these stations.

Exposed stations cover all others, and carbon dischargers and fuses are fitted at these stations.

Superimposed telegraph circuits, which are usually leased to the telegraph companies, are arranged on both "simplex" and "composite" systems. The "simplex" is the well-known system which gives one Morse circuit superimposed on one telephone pair by means of repeating coils. The "composite" gives two Morse earthed circuits, which can be worked either sin-

gle or duplex, and one metallic telephone circuit on one pair of wires.

The theoretical connections of a terminal composite set are given in Fig. 5. For telephone signaling over circuits fitted with "composite" apparatus a special ringing set is provided. The same ringing set is sometimes used on the "simplex" system.

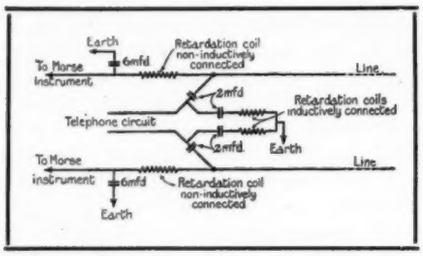


Fig. 5. System of Superimposing Two Telegraph Circuits on Telephone Pair.

The telephone transmission loss due to the introduction of a repeating coil at each end of a telephone circuit on the "simplex" system, is equal to about one mile of standard cable, while the loss on a circuit equipped with a "composite" set at each end is equal to about ¾ mile of cable.

The minimum speech efficiency on the long distance circuits ranges from 30 to 36 miles of standard cable. The general dryness of the climate contributes to a high standard being attained.

Long distance lines are equipped with lightning dischargers on the poles at suitable intervals. Where these wires are taken into an office or testing station, it is a common practice to place the dischargers one or more poles away on each side of the office. The Chapman discharger shown in Fig. 6 is a type much used for this purpose.

On main distribution frames carbon dischargers and heat coils are used by the Bell company, but carbons and fuses are more generally provided by other administrations.

There is no through communication yet between the eastern and western shores of Canada. There is a break of 600 miles between Fort William and Kenora in which there is no telephone line at all, and the Rocky mountains form another break between Alberta and British Columbia.

The longest lines regularly in use in Canadian territory are those between Montreal and Windsor and Montreal and North Bay, distances of about 600 miles. Loading coils are in use on both open-wire and underground sections of the long distance circuits.

Communication is given with a large number of places in the United States through the long distance lines of that country, the longest distances being Montreal to San Francisco, 3,800 miles, and Toronto to San Francisco, 3,200 miles. (Communication has since been arranged between Montreal and Vancouver, via the American transcontinental line, a distance of about 4,000 miles.)

The telephone development of Canada is higher than that in any of the other dominions or colonies. For the whole of the country the average number of telephones per 100 of the population is 6.5. In British Columbia the average is as high as 11, while in Manitoba and Alberta the figures are 10 and 8 respectively.

Probably no country in the world has taken up automatic telephony so wholeheartedly as the commonwealth of Australia. In 1912 the chief electrical engineer personally investigated the systems then in use in America and Europe. His report, dated October 10, 1912, deals in a very thorough manner with the comparison which may be made between manual and automatic systems.

Since then important headway has been made. Full automatic equipment has been installed in 10 exchanges, the largest of which is Perth with over 3,000 subscribers. Six other exchanges are in course of construction or approval. Tenders have been invited for a further 18, and 14 others are under consideration. The exchanges so far opened are all equipped with the Strowger system, but both the Siemens and the Western Electric Co.'s systems are to be tried.

Both central battery and magneto exchanges are in use. Distribution from all the larger exchanges is effected by means of underground cables.

On very small exchanges open-wire distribution is adopted. A good deal of aerial cable of both the dry-core and rubber types is installed, but its use is rigidly prescribed as its erection is not economical in the commonwealth where the estimated five years' capacity is 50 pairs or over.

On exchange distribution it is the practice to serve subscribers' premises by underground cable wherever this is warranted. Where cables are led to open wires for distribution, they are connected through a pole distribution box, several types of which are in use.

The practice laid down for the provision of protective apparatus is well thought out. At junction points between exposed and unexposed cables and wires, fuses and arresters are generally installed. Outside protection against lightning is not usually adopted, apart from exchange distribution lines, unless in the opinion of the local engineer such is warranted.

There is a fairly extensive long distance system within the individual states, but the only capital cities as yet connected are Melbourne-Sydney (595 miles) and Melbourne-Adelaide (487½ miles). On both of these circuits Morse duplex is superimposed and worked regularly. Proposals have been put forward for a Sydney-Brisbane toll circuit. On certain of the main lines the circuits are twisted, but on other main lines and on country lines, the transposition system is in use, and this system is likely to be continued. Loading coils have not yet been introduced into the commonwealth.

The percentage of telephones to the population at the end of last year was 2.721.

New Zealand was very early in the field, and many of the exchanges installed between 20 and 30 years ago are still in operation. Many of the larger exchanges have become quite inadequate for present requirements, and the question of substituting more efficient systems has been before the authorities for some years past. The introduction of the central battery manual system was contemplated, and three Western Electric central battery exchanges were installed, but the administration hesitated to introduce this system generally in view of the development of automatic systems.

In 1911 the chief electrician of the department recommended the adoption of automatic exchanges for several of the principal towns, and the Western Electric Co.'s full-automatic system was decided upon. Contracts were entered into with this company for exchanges for the Wellington and Auckland telephone areas, and for separate single exchange installations for Masterton, Hamilton, Oamaru and Blenheim. Masterton and Hamilton are being equipped for 800 lines, and Oamaru and Blenheim for 600 lines. The ultimate capacity of each of these exchanges is the same—1,800 subscribers' lines, and 200 trunk lines for special services.

At Wellington the system will have three main exchanges with immediate

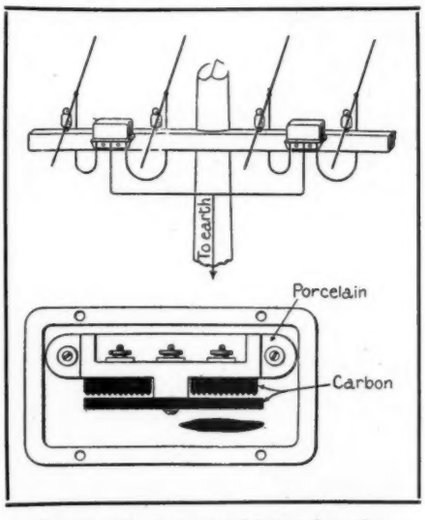


Fig. 6. Chapman Lightning Arrester.

equipment respectively for 4,000, 2,500 and 600 lines (ultimate capacities 8,000, 4,000 and 2,000 respectively). In addition three sub, or "satellite" exchanges off the largest main exchange with capacities

from 200 to 600 lines are contemplated, the ultimate capacity of the whole system being 20,000 lines, and accessory junction lines.

At Auckland the arrangements will be on similar lines with four main exchanges, and two "satellite" exchanges, the total ultimate capacity being the same as at Wellington. Each system will have a common manual toll board situated at the principal exchange in each case.

Subscribers' meters are not being installed at present, but provision is being made so that they can be put in either in part or whole at any time, and the meters, when installed, will register effective local calls only.

A time alarm signal is provided to indicate an earthed line, and also to show when a subscriber's line is being wrongfully held up.

All exchanges are arranged for main line service, private branch exchange service and for party line service. There is every confidence that the system will adequately meet the very varied telephonic conditions of the country, and it is not too much to say that before many years have passed all the important exchanges throughout the dominion will be "automatic."

There is a considerable network of trunk telephone circuits. Nearly all outlying exchanges are connected with their larger centers, and some of the latter are interconnected.

The longest speaking circuit is that between Wellington and Auckland, a distance of about 420 miles. This is obtained from two 400-lb. copper wires which are used for quadruplex telegraph purposes during the daytime. At nighttime—after 6 p. m.—they are used as a telephone toll circuit. In many cases telegraph circuits are superimposed on the telephone wires, and phantom telephone circuits are also obtained. The standard of speech on trunk lines is the equivalent of 30 miles of standard cable, and the introduction of loading coils is under consideration.

The number of telephones per 100 inhabitants is 4.6.

Latest Iowa Purchase by Bell.

(*Concluded from page 10.*)

tecting the public's rights and the United States Independent Telephone Association proclaims its purpose and intention to protect the interest of both the public and the affected companies. It has in fact done neither.

The public's interest in this sort of a transaction is very real, as may be easily shown by a short comparison of results obtained in 1916. Bell gross revenue per station for that year was $38.45.

Independent gross revenue per station was $28.04, a difference in favor of the Independently-operated companies of $10.41 per station.

Now "gross revenue" is what the public pays for its telephone service, so, for every station purchased by the Bell, the public will have to pay $10.41 additional per annum, as the Bell's expenses are already so great it dare not allow its gross revenue to decrease even in the slightest degree. The Farmers & Merchants Telephone Co. has already raised rates on much of its rural service.

The public's financial interest in this single transaction may readily be determined when it is borne in mind that upwards of 10,000 stations are included in the transfer just made.

From time to time we have heard much about what the Independent telephone association and the Independent manufacturers were going to do to the Bell telephone company, and to the alliance existing between the Bell telephone company and the Western Electric Co., of Chicago. And, indeed, for a time shortly after the organization of the Federal Trade Commission it did look as though the manufacturers were intending to take some real action.

Much whispering was heard about evidence of illegal acts on the part of both these concerns; a great deal of quiet investigation seemed to be going on here and there; and at the last convention of the national association a government attorney was present, and interviewed many of the visitors, operators, etc., and seemed to have quite a good deal of evidence at his command. However, just at this time the Bell organization, apparently frightened at the protests against unfair competition, began to let down the bars somewhat and buy equipment from Independent manufacturers. This was considered an encouraging sign, but everybody in the Independent field hopes it does not mean a cessation of the fight.

It would be a typical Bell move if the Western Electric and Bell companies together arranged a scheme whereby the Independent manufacturers were to be temporarily chloroformed with large orders for material while the purchase of the operating plants themselves went steadily on, so that when the manufacturers woke up there would be no plants left to buy their apparatus.

Many Independents fear that little can be expected of the United States Independent Telephone Association as they believe that it is completely dominated by men who either are so comfortably established in their relation with the Bell company that they do not care to disturb the existing situation or they are unable to do anything. In fact, it might be summed up this way—those who *can* do something, do not *want* to; those who *want* to do something, *cannot*.

Mr. Robinson, the new president, is the active head and executive manager of perhaps the largest group of strictly competing Independent telephone properties in the United States today. In this fact lies the only ray of hope visible at this time, as we already know that other officials who have been connected with the association seem not disposed to go on beyond a certain point.

The best legal talent obtainable has repeatedly given assurances that the way to stop these unfair and illegal practices is both clear and effective, but no national board of directors has been inclined to adopt remedies thus offered. What will the new president do?

Outing Planned by Benton County Telephone Association.

The meeting of the Benton Independent Telephone Association, held at Delphi, Ind., June 21, was opened by President W. L. Bott, secretary and treasurer of the Jasper County Telephone Co. On account of the absence of Mr. Conway, of Brookston, Mr. Warner acted as chairman.

Miss Mary Walker, manager and owner of the Carroll County Telephone Co., of Delphi, addressed the association and extended a hearty welcome to the city. Miss Walker made the necessary arrangements for the meeting, which was complimented on very highly. Among the arrangements was an excellent chicken dinner at the hotel, which was very much appreciated by those in attendance.

Arrangements were made at this meeting for a picnic to be held at Gay Park, near Brookston, Ind., on Thursday, July 19. All Independent telephone men in that section of the state are invited to attend this picnic and basket dinner.

The association will also hold its regular meeting in the pavilion of the park. The various member companies of this association are arranging for their linemen, operators, managers and owners to be present in order that they may have an opportunity to become better acquainted with one another, so that there will be greater co-operation in the future among all concerned.

The officers of the various companies are now engaging new girls to operate their switchboards in order that all of their permanent operators may be in attendance at the picnic. This is a splendid movement, inasmuch as it is very seldom that all the operators can enjoy such an outing.

The association has appointed T. H. Hanway, of Monticello, to purchase, at the expense of the association, refreshments which will be free to those in attendance at the picnic. W. L. Bott, president of the association, is chairman of the committee on entertainment.

Calls from Pay Stations.

Statistics gathered by the New York Telephone Co. show that each day there is an average of 3.7 calls for each of the public telephones in New York City.

Fundamental Principles of the Telephone Business

A Reading Course Designed to Present Logically the Principles Which Underlie Successful Organization and Operation of Telephone Properties—Prepared Under the General Supervision of Stanley R. Edwards—This Section, "Part VI, The Valuation of Telephone Properties," Written by Chas. W. McKay

Quiz Questions on the Preceding Installment.

190. Although the items which make up the larger part of the value of a telephone plant have been considered, what items are still to be discussed?

191. In general equipment account No. 260, what items are excluded? What kind of equipment should be inventoried under the heading of general equipment?

192. In inventorying the office furniture and fixtures, what subdivision is advisable? What exceptions are to be noted in making up this inventory?

193. Why should the cost of small portable tools, which frequently have to be replaced, be entirely omitted from the inventory of the general shop equipment?

194. What precautions should be observed in inventorying the general store equipment?

195. What mistake is often made by appraisers in appraising stable and garage equipment which consists of second-hand vehicles and material? Give an illustration.

196. What costs are included in account No. 265 which covers general tools and implements?

197. To what extent should the items involved in the inventory of materials and supplies be described?

198. Into what three general classifications may the inventory of the right of way be divided?

199. Should the method of procedure outlined for the inventorying of a telephone property be followed in detail?

CHAPTER XI. Unit Costs.

200. *Importance of Unit Costs.*—It is hard to say which phase of the appraisement problem is more important—the inventory of the physical property or the preparation of the unit costs. One thing we do know, however, and that is, assuming honesty of purpose and a reasonable degree of efficiency on the part of the field inspectors, most of the inventory errors will be found compensating. For instance, errors of omission in inventorying the wire plant will probably be nearly offset by errors of commission.

Experience has proven, however, that plant is more frequently left out entirely than duplicated; hence, the almost universal practice of adding a specific allowance to the reproduction cost of the inventoriable property to cover omissions. However, if an erroneous assumption is made as to the labor or material costs when building up the wire unit costs, and if these unit costs are used as a basis for appraising all of the wire plant, it will be readily seen that a serious error may result. Then again, a regulatory body is much more likely to make a detailed analysis of the unit costs than of the inventory of physical property.

A few errors in the unit costs—even if they are of a minor nature—may tend to cast suspicion on the entire appraisal, including inventory, collateral costs and intangible values.

It will therefore be seen that the preparation of the unit costs is a most important feature in the appraisal of telephone properties. This portion of the work should be carried on under the direct supervision of the appraisal engineer and every unit cost, before it is applied to the inventory, should be subjected to the most careful analysis by the appraisal engineer and should be checked by every available means. For obvious reasons the unit costs, if determined by a disinterested appraisal engineer, will carry more weight before reviewing bodies than if prepared by an engineer who is an employe of the company submitting the appraisal.

201. *Unit Costs and the Inventory.*—Long before the completion of the field work, the unit cost study should be well under way and every effort made to complete each set of unit costs by the time the corresponding portion of the inventory is finished. In this way the confusion, so often noticeable during the last stages of a public utility appraisal, may be entirely avoided.

The pole and wire inventory is usually the first to be completed in the field. By having the pole and wire unit costs ready for use immediately upon completion of the inventory, this portion of the appraisal may be disposed of in a comparatively short time.

202. *Material Prices at Time of Appraisal.*—The first step in the preparation of the unit costs consists the determination of material prices as of date of appraisal. Quotations should be secured from dealers in, and manufacturers of, every class of equipment found in the plant. For equipment usually purchased on a competitive basis—poles, cross arms, wire, cable and conduit—quotations should be secured from a number of concerns. Highly specialized equipment, such as telephone switchboards, private exchanges and subscribers' instruments, can, as a rule, be exactly reproduced only by the original manufacturers and every effort should be made to ascertain prevalent market prices of various apparatus and material as of the appraisal date.

203. *Determination of Material Prices for Period Preceding Appraisal.*—Having obtained all possible data relative to fair prices, as of the date of appraisal, the next step involves the determination of corresponding prices for the several years preceding the appraisal. Usually the best way to accomplish this end is to assign one or more men, according to the individual requirements of the case in hand, to the task of reviewing the company's invoices for the several years preceding the appraisal.

For each class of material the following data should be noted: Date of purchase, quantity purchased, name of manufacturer or dealer, the total cost and the unit cost.

Prices that seem abnormally high or abnormally low, should be carefully investigated before they are accepted for use in the final determination of the unit costs.

204. *Fair Material Prices for Appraisal Use.*—With this data—the market prices for the various types of equipment as of the appraisal date and for the several years preceding the appraisal—tabulated in proper form the determination of fair material prices for use in the appraisal under consideration is a comparatively simple problem.

It is possible that the reader may gain the impression from the foregoing discussion that average prices for the several years preceding the appraisal should be used in all cases. This is not necessarily true. Take for instance the present material market. It is undoubtedly true that the conditions resulting from the present war will continue to affect the material markets for some years to come, even if peace is declared within the next few months. Obviously, the appraisal engineer in deriving fair material prices as of the present date, must take into consideration the fact that although prices are higher now than they have

been for some years past, there is every reason to suppose that present market conditions will prevail for some years to come.

In the last analysis, a determination of fair material prices, as of the appraisal date, is dependent not only upon the prevailing prices for the several years preceding the appraisal but also upon the possible market trend during the several years following the appraisal.

The appraisal engineer must take into account: First, past market conditions; second, market conditions as of the appraisal date; and third, the probable trend of the future material market. In other words, having all of the available facts in his possession bearing on the problem under consideration, the appraisal engineer must use his best judgment in determining fair material prices for the appraisal in hand.

205. *Unit Labor Costs.*—The labor cost study is considered after the fair material prices have been determined. Work orders and completed estimates for the several years preceding the appraisal should be carefully reviewed and all possible data pertaining to the cost of setting poles, placing cross arms, stringing wire and cable, building conduit, etc., should be tabulated in such a form as to render possible a careful analysis of past and present labor conditions.

The utmost care should be exercised in selecting records of completed work that represent average conditions—conditions that approximate as nearly as possible those that would probably be encountered in reproducing the plant as of the appraisal date.

Obviously, unit costs derived from job orders covering small installations cannot be considered as representative for the purpose under discussion. Unit labor costs are necessarily much higher for piece-meal than for wholesale construction.

Another and a very practical source of unit cost data will be found in the foremen in charge of the various construction and installation gangs. Many telephone foremen, for their own information, keep a detailed record of the time spent on the various kinds of work falling under their jurisdiction.

It is also true that men who have been in the employ of a company for a long period of time are apt to be well posted as to soil and sub-surface conditions encountered in the original plant construction.

206. *Use of Curves to Show Fluctuations of Prices.*—When all of the available sources of information have been properly tabulated, the resultant data should be a great help in the determination of fair unit costs. In this connection, curves showing graphically the fluctuation of material and labor prices over the period of years preceding an appraisal will be found a material help to the appraisal engineer.

CHAPTER XII. Unit Costs of Land, Buildings and Equipment.

207. *Land Appraising and Purposes.*—As has been previously stated in the discussion of land in Chapter VII, courts and commissions have usually ruled that the appraisal of a utility corporation's land should not be made by a consulting engineer—but rather by a real estate expert. Nevertheless, even if a competent expert is employed for this portion of the work, it is always well for the appraisal engineer to carefully verify the findings of the expert.

It frequently happens that appraisals are made for other purposes than as a basis for rate making. The writer has just completed an appraisal of the property of a small telephone company located in a state where public utility corporations are not at the present time subject to the dictates of a public service commission. This company merely desired to gain as accurate a knowledge as possible of its tangible and intangible assets, so that it would be in a position to properly administer its financial affairs.

Cases of this kind are numerous and with the thought that the employment of a separate real estate expert for land appraisal is a rather expensive proposition, it is proposed to consider this subject of land unit costs and land appraisals more specifically than was done in the foregoing treatment of the subject of land inventories.

208. *Differing Opinions as to Theory to Be Used in Land Appraising.*—The proper method of appraising the land of a public utility corporation is a subject upon which there is a marked difference of opinion between experts. It has been argued that there is no logical reason why land or right of way belonging to a utility company should be considered on a different basis from that of similar property owned by an individual. On the other hand, it is unquestionably true that the development of utility properties has often increased the value of the adjoining land. This is especially true in the case of railroads.

Land along a railroad right of way is obviously much more valuable after the railroad has been built than before. Some experts argue that in evaluating the land or right of way of a railroad company, this fact of increased values of adjoining properties should be given due weight and the railroad allowed to benefit by the general increase in prices.

If this theory is conceded to be a reasonable one, then it, of course, follows that the utility corporation must suffer the consequences if the use made by it of certain parts of its plant has caused a decrease in the value of the surrounding property. It will be readily seen that the use of land for car barns, storage yards, etc., may be considered objectionable in a residential district and may cause a decrease in surrounding property values.

The attitude of the courts on this subject is evidenced by the following quotation from the Columbus Southern Railway vs. Wright, 151 U. S. 481: "The value of the land depends largely upon the use to which it can be put, and the character of the improvements upon it."

209. *Methods of Appraising Land.*—There are two generally accepted methods of determining the value of land: First, the expert method; and second, the sales method.

Each of these methods has been subjected to a good deal of criticism. Hence in appraising the land of a telephone company, as already suggested, it is usually advisable to employ both of these methods so that if one of them is objected to by the court or commission in question, the other may be substituted.

210. *Expert Method of Land Appraisal.*—The expert method, as already stated, consists of the appraisal and description of the land by competent local real estate experts. If the land under consideration is valuable and if its value forms an appreciable portion of the total value of the plant, it is advisable to employ two or more experts to work upon the problem independently.

In a case of this kind a fair value of the land in question may often be obtained by averaging the respective values submitted by the experts. This latter plan, however, has the disadvantage of disqualifying the experts for testimony before the commission. Of course, no expert will be willing to take the stand and testify to a modification of his original estimate.

If this averaging plan is employed in determining the value of a telephone company's land, it should be accompanied by a careful and detailed explanation of just how the final value of the land, as submitted in the appraisal, was obtained. Then if the court agrees to the propriety of averaging the land valuations submitted by a number of experts, the experts may be subsequently called to verify their individual estimates.

(*To be continued.*)

Decrease in Cost of Service.

When the first telephone exchange in Cincinnati, Ohio, was opened 39 years ago by the Cincinnati & Suburban Bell Telephone Co., each subscriber had the privilege of calling and talking to 17 other subscribers, and for this privilege he paid $36 a year. Today a Cincinnati subscriber has the privilege of talking to nearly 90,000 subscribers located in the territory where there were formerly 18, and at considerably less than $36 for party-line service.

Practical Subjects—Discussions

Sunshine and Shadows Along the Telephone Trail.

By Well Clay.

Oh! the Fourth of July in the long ago,
How the memory clings as we older grow,
Of the way we arranged with pals overnight
To pull the string when the morning light
First broke the pall—how our big toe
Even remembers the Fourths of long ago.

How the early boom of the cannon made
Us scramble for our clothes in haste, afraid,
We'd miss some part of the grand event,
And, skipping our breakfast, off we went
To the place where they let the big guns "go"
On the Fourth of Julys of the long ago.

How we shot the crackers and snapped the caps—
Getting a burn or so of powder perhaps—
And searched for squibs in the castaways,
As the hours fled on those glorious days,
Before sorrow and trouble we'd come to know—
On the Fourth of Julys of long ago.

The sun hath set no more to rise
On the glorious days of those past Julys;
No more for you the grand parade,
Or the stomach-ache from the lemonade;
No more are you called by string-tied toe
As on Fourth of Julys of long ago.

A message sent over a string tied to your big toe and running from thence out of the window to a place within reaching distance of your boy friend, should he awake before you on this momentous occasion, is sure to get your attention at the first "ring." But it is hard on the toe if your friend is in a hurry and you don't respond with that alacrity which he thinks is due for the time.

Now-a-days our boys arrange the night before to have central call them up at a certain hour and that's all there is to it. All the fun is gone because most of the uncertainty of oversleeping is eliminated.

The telephone is but a modern vehicle for performing a function which is not new at all. Messages have been sent in various ways from time from which the memory of man runneth not back. Each new method of overcoming time and distance in the transmitting of intelligence was but slightly better than the preceding customs until the telephone widened the circles of space and narrowed the time of transmission to such an overwhelming degree that it was heralded as a new discovery.

It was a new discovery to most of the world, and people are still discovering the thing after all these years which it has been with us. A man who lives within eight miles of this office just discovered the telephone this morning. Of course, it has been around him for years but he knew of it only in an abstract way, the same as we know about famine and pestilence. It is only when these are brought home to ourselves or families that we really get an idea of what they really are.

This man had occasion all at once, after all these years, to telephone to a doctor immediately, and the price which he would have been glad to pay for just two minutes of talk with the family doctor would have been ample for us as pay for keeping him in telephone service ever since we have been doing that little thing for this community. This is only one case from many which all of you could duplicate in your own neighborhoods.

Is this man to be blamed for having lived within connecting distance of a telephone all these years and not taking advantage of the blessing? Not at all, unless you wish to blame yourselves for doing the same thing regarding your discovery of many things in the world in which you live.

For instance, how long were you in discovering the need of taking a trade paper and of reading it thoroughly that you might keep up with the procession? How long were we in discovering the imperative need of arranging for an adequate schedule of rates on which to prepare for the worm of depreciation which dieth not, nor tires, but which worketh harm to our properties daily and nightly, even on Sundays and holidays? When did you discover the *only* girl in the world?

These things had been available for some time, perhaps, but, like the farmer, the consciousness of imperative need was not awakened by the knowledge of the existence of such things. You had to *discover* your need, and for you the discovery was the beginning of such things in your world, no matter how long the rest of the world had known them. Do you begin to see?

The fact that some one tells you about a thing does not necessarily convey to your mind an adequate conception of it any more than reading about the itch qualifies a man to tell some one else how it feels. A man suffering from the infection could beat the theorist to death in a recital of the sensations which the infliction brought him. You hear about war, but you do not know anything about its horrors until you or your kin go to war, and then you begin to have some knowledge of its effects.

This man who lives in a world of telephones and does not discover one is not a strange person at all. He is entirely normal and, being normal, is more or less human. He does not wish to spend his money for something which is of no apparent interest or value to him and consequently which he does not covet. His man-servant and his maid-servant may have discovered the uses, but he is not conscious of any void in his life caused by lack of communication until all at once he needs it sorely and has it not.

Like the man who has lived by a sparkling stream all his life, knowing not the lack of nor missing water until one day he journeys to a far country, by way of sandy desert and blistering sun. Then as he turns gladly to the water bottles in genuine appreciation of the blessings of that liquid and finds that the man-servant has forgotten to fill them because water seemed of little use, he discovers water for the first time. Of course he is too far off to repair the damage in a hurry; so he blames the servant or his wife or some one else—never himself—for the oversight and goes miserably forward.

If he chances to survive, he takes good care thereafter to always have a good water supply near him at all times, even though he may never be in a like situation again.

This man that I speak of, who has just discovered the telephone, was a good deal like many others and said he would have had a telephone before but his wife never seemed to care for one and so they had gotten along—laid it on to his wife, you see.

She, poor soul, probably had long years ago learned not to care for things which cost money, unless her worse half wished them first, but secretly had been wishing for a telephone for a long time so she could be like other folks.

He will have a telephone by his side now, though he may never have another occasion like the last one for its use—I hope not, at any rate.

He will have use for it daily, like the man by the stream had use for the water, but he will see it in a new light, like the other man did the water after he had had a few experiences. When he took a drink thereafter he thought of the blinding sun and the desert sand. You know he did. This man when he uses the telephone will think of a past emergency, a scene or sorrow which could have been saved if he had only discovered the telephone sooner.

People do this thing all the time—so do nations. Only recently have we as a nation discovered wheat and breadstuffs. That old saying that "bread is the staff of life" has only recently been interpreted to many in our country by recent events, so they knew what the man was driving at who said it hundreds of years ago. The echo of the empty flour barrel sounds louder than it did years ago, when mother

whacks its sides to get the remainders before ordering a fresh supply.

We are all discovering things continually. Columbus discovered America, the Democratic party acquired America and the kaiser has America thrust upon him. This saying is true enough because we can discover and acquire and have thrust upon us, and all three are simply discoveries to us, some in one guise and some another.

You discover the value of batteries when stalled on a lonely road far from the piratical garageman's cave; you discover the value of sleep when you suffer from the lack; you discover the virtues of moderation after you have over-indulged; you are constantly discovering, like each new generation of small boys, the delights of the Fourth of July. Why blame the poor man who was so long in discovering the telephone?

APHORISM: We freely condemn in others the weaknesses we condone in ourselves.

P. S.—I discovered a 10-pound pickerel and four black bass this a. m. I like discovering.

Lightning Arresters and Their Action on a Mountain.

Enclosed are a few notes regarding a case of damage to a telephone line by lightning at this point—"Rock House," eight miles southeast of Highlands, N. C. I am not a telephone man, therefore, if I miscall technicalities, as Kipling says, or display my ignorance in various ways. I may be excused.

The United States Forest Service has in this section, which comprises the Savannah National Forest, some 50 miles of telephone lines, mostly one wire, grounded. Recently, about June 1, they constructed a branch line terminating at my house. It is about a mile long or one and one-eighth, including a short branch already built. My house is on a mountain about 500 feet above the junction with main line.

At my house is installed a — telephone (most of the telephones on line are Western Electric. I was guided by an advertisement in TELEPHONY in buying this). The wiring was done by J. E. Potts, United States forest ranger, in charge of forest office at Highlands, N. C. He is a practical telephone expert of many years' experience on lines and instruments.

Two protectors were installed—one on the nearest pole to the house (45 feet) and the protector which goes with the telephone, being the one used by the manufacturers on all their instruments till recently. It is of the discharge surface kind, consisting of carbon pencils and a metal cover. The ground was good and the ground wire was No. 12, B. & S., insulated drop wire; line wire is of No. 9, B. B. galvanized iron wire.

On June 13, during a sporadic thunderstorm, a heavy bolt of lightning struck the line about one-fourth of a mile from the house. Most of the discharge came toward the house, though a large portion of the bolt jumped off the line on four different trees on the way. Two of these were trees the line was fastened to, and two were close by it, but no marks were found on the poles of which there were six on the way. On the trees, a small furrow was torn through the bark below the wire.

A portion of the bolt came into the house on the line wire, and a small portion entered the telephone, knocking off a few splinters, but not burning out any coils, or putting the instrument out of commission. A large portion of the bolt jumped from the telephone and tore splinters from a nearby window casing, and also penetrated the wall. A child in the same room was not shocked.

A lesser charge of electricity reached the only other telephone on the branch line, a mile away, badly smutting and fusing the carbons and metal blocks of two arresters there. A child near the latter house was shocked.

The discharge passed a switch at this telephone, which breaks the line, and was heard a mile and a half north, as a loud pistol shot on the main line.

The point I am coming to is that neither of the arresters on the telephone and line at my house were of any value whatever. Why was this? All wiring was first-class and grounding good at the nearest pole to the house, about 50 feet from the telephone.

I wish to note especially that lightning is very dangerous in this region, large numbers of trees being struck. While telephone lines are often struck, rarely does lightning enter a house from a telephone line.

In the present case, the impression given is that the bolt did not strike the line at a localized place, but that there was high electrical tension and a discharge took place through the line. About 15 minutes previously, a bolt struck to the north of the station, estimated at between an eighth and a fourth of a mile distant, while the point on the line where the bolt seemed to originate was one-fourth of a mile northwest of the house. The accompanying thunderstorm was of the local heat variety, and was not severe, only two severe strokes being noted. The rainfall was .40 of an inch after the line was struck with a trace before.

The United States Forest Service lines are primarily for fire protection. The telephone holders are not subscribers, but co-operators. No switchboards are maintained at the government (forest service) offices, but connection is made with the private exchange at Clayton, Ga. At the Highlands office, they use carbon arresters only for protection, with no fuses.

J. E. Potts, United States forest ranger in charge of the office at Highlands, has had much experience with fuses for telephone protection from lightning and considers them useless, and troublesome, also. He is opposed to their use.

I shall be very glad to hear from readers of TELEPHONY as to the proper protection for a telephone in an exposed situation—a dangerous location such as mine—and also as to why the arresters failed to act. We do not have a different arrangement of arresters.

Barry C. Hawkins,
Co-operative Observer, Weather Bureau.
Box 78, Highlands, N. C.

Improving the Transmission of Toll Lines.

One bad sleeve in a short line does not cause a great deal of trouble—it may scarcely be noticeable, says James Stewart in The Mouthpiece. But even one bad sleeve in a long line is a serious thing and with many bad sleeves or hand connections in a long line, it is indeed bad for transmission.

I have heard men discussing the necessity of scraping old copper wire before putting on a sleeve. Claims were made that the twisting of the sleeve cleaned the wire sufficiently and that the dirt removed by the twisting, although remaining in the sleeve, was not harmful. It is a fact that putting sleeves on dirty wire is not good practice. The wires are not properly cleaned by the twisting of the sleeve and the dirt left in the sleeve by this process is very harmful.

There is nothing that gives so much satisfaction as the feeling you experience in knowing that you have done something that will be a credit to you. A toll-line inspector was making excuses the other day for the short stretch of line he had covered, even though he produced six sleeves ranging from one and one-half to two turns and as many glass and hand connections as the results of about a half-day inspection.

On measuring the sleeves and other connections that had ends sufficiently long, I found that he had succeeded in cutting out almost four ohms' resistance. One of the hand connections, when cut in series with a circuit and a receiver connected in multiple with it, was so bad that I was able to hear parts of the conversation by shaking the wire, and at all times got part of the ringing current through the receiver. If the inspector referred to can find only half as many such conditions and eliminate them on each inspection, he surely will have accomplished much that will be to his credit.

Let everybody develop into a toll line inspector when traveling along the toll lines. Keep a sharp lookout for sleeves with less than three turns, hand and glass connections.

Magneto Service Must Be Bettered

Discussion of Attitude of Small Magneto Plant Owner Towards Telephone Business—Those Who Are Not Making Good Should Get Out and Let Those Who Can Develop Plant Take It, Putting The Plant on a Paying Basis

By Thoughtful Observer

During the past five years, large magneto plants have bettered their service and reduced operating costs by changing to common battery. Still larger plants, already common battery, have accomplished like results by adopting the automatic features now offered in the latest and most highly-developed types of common battery equipment. Small magneto plants, generally speaking, have stood still and done nothing.

The average man, with a large magneto plant, is straining every nerve to put it on a common battery basis. The average operator of a common battery plant is anxious to effect further improvements and economies in operation. The average owner of a small magneto plant—we say it in sorrow—is disgusted with the telephone business; has lost all interest; has no hope of better rates or better service, and is content to merely exist, setting up what falls down, patching up what plays out and hoping—always hoping—for a chance to "unload."

What is the reason and what is the remedy? The reason is: Lack of respect of and for the business by proprietors and patrons.

The remedy is: Making good this deficiency.

Now, understanding that we are referring only to those who are not making good, let us change to the second person, and speak directly and plainly.

Be Honest With Your Business.

You know you cannot succeed in a business you don't believe in, so why hang on and continue to operate a tumble-down plant at ruinous rates, and so pull down the standard of the business to a still lower level, making it harder for your neighbor, who wishes to progress? Either make up your mind to stay in the business and boost it—at least until you have something to sell—or get out at once, not by unloading your plant on some "sucker," who knows nothing of the business, but by turning it over to some practical, hard-working telephone man, at a fair price, and see what he can do with it.

Have him take out a seven or ten-year special life insurance policy, payable to his estate, and turn it over to you, in addition to a mortgage on the plant. Insist on prompt payment of interest, and don't bother him for any of the principal until he has had a chance to get squared away.

If you pick a man with the right kind of stuff in him, the plant will soon be so enhanced in value as to make your paper sound and relieve you of any possibility of having to take the property back. Even should you pick the wrong man, and have to take the property back, you will lose nothing, because the chances are he will have fallen down by trying to rebuild the plant too fast, and will have improved it for you at far less expense than you could for yourself.

If you elect to stay in the business with a determination to boost it, and to do your full share toward making it better, well and good, and we congratulate you on your decision. If you decide to withdraw in favor of someone better fitted by practical training to give more efficient service, and to better the rates and equipment, you are deserving of special credit for giving your business the square deal it deserves.

If you do neither and continue your present policy of attempting to "milk" the property, and unload it for more than its value, when you find it is about to fall down, please consider this a friendly warning, that state commissions and the general public are becoming more and more familiar with individuals of your class in public service—and, by the signs of the times, you won't be able to get away with your present policy much longer.

But the men who want to stay in the business and do the right thing, and the men willing to take on an old plant and build it up, are deserving of the greatest credit and all the help and co-operation possible from associations, manufacturers and commissions.

Yours is the big job of getting the small exchange business out of its present slump, and making it deserve and receive proper consideration from all sources.

To do this you must first of all make your patrons think of you and your business. So, start advertising. Start today! Better service and better rates should be your ultimate object, but don't spring this too strong at the very beginning. Make your campaign largely educational, teaching the proper use of the telephone and gradually working in reminders as to what you are doing for the good of the service, and what it costs you to do it.

Advertising in Local Mediums.

Newspaper space should be used and your editor educated to mention the telephone at every possible opportunity. The local moving picture shows enable you to do a large amount of advertising at trivial expense, since the leading Independent manufacturers have spent large sums in preparing quantities of slides suitable for advertising purposes. Write them today, or consult their catalog of such slides, which you may have received, but have never looked at.

If you can possibly do so, start property betterments at once, and see that the public learns of every improvement you make. Regardless of whether the amount you can spend be large or small, remember that money goes much farther when mixed with careful planning. Even if new materials be out of the question, you can at least institute a soldering campaign to get rid of bad iron-to-copper joints at office poles and ground rods. If you don't know how to do telephone soldering, don't fail to call in a man for a day, and have him teach you that indispensable art.

If you cannot spend the money to rebuild entire leads, possibly you can put in new corner and terminal poles, so that slack can be pulled and "crosses" avoided. Whatever work you can do, make it a point *to do it right,* and in such a manner as to attract attention and show the community what you would do to the entire plant if you had the chance.

Do Away With Temporary Work.

Gradually you will find that as you cut out temporary work and do thoroughly what you can, you will have more money for other improvements, and will shortly be in position to ask and get a decent rate.

But don't get the idea you can appear

Misdirected Effort.

In every business and on every hand can be seen evidences of misdirected effort; and how different the results would have been had those efforts been directed along the lines of intelligent energy! Let us get the efficiency habit! It is a bigger asset than a heritage of genius.—A. L. Upton.

C. O. Baker, President C. W. Baker, Vice-Pres.

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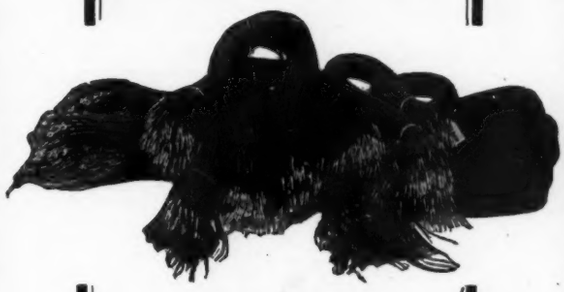

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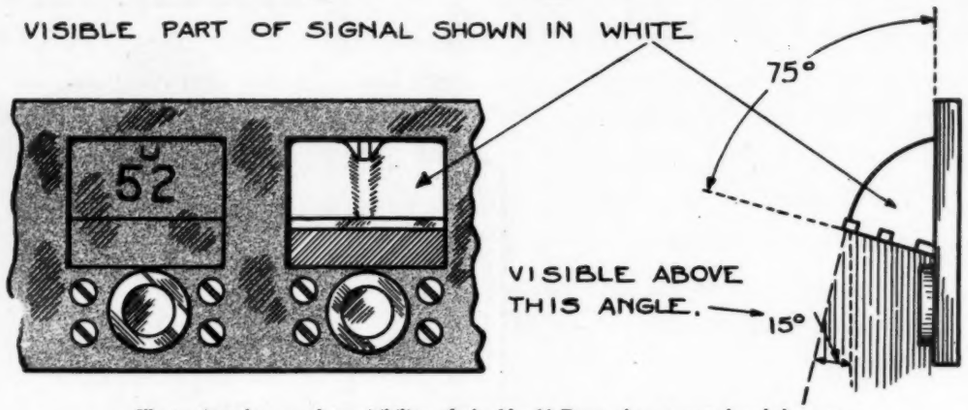
No. 11 Drop Compels Attention



Illustrating the complete visibility of the No. 11 Drop when operated and the way it blends with the background when normal. Shaded part of right-hand diagram shows the small region of obstructed vision.

OPERATORS give better service with a switchboard equipped with our No. 11 Drops because the signals given are more prominent than those given by other drops.

The shutter in the call indicating position projects $\frac{7}{16}$ inch from the switchboard face and shows three bright aluminum surfaces against a background of dull black. In other types the shutter simply uncovers or partially uncovers a flat surface.

The No. 11 Drop shutter, when operated, can be seen from any angle except directly beneath and 15 degrees out from the face of the switchboard—a viewpoint which the operator cannot get.

Check up the visibility of your drops by actual measurements and compare them with the diagram above. The figures you obtain will answer your question "How can we improve our Service?"

Use the No. 11 Drop.

Stromberg-Carlson Telephone Mfg. Co.

Rochester, N. Y. Chicago, Ill.

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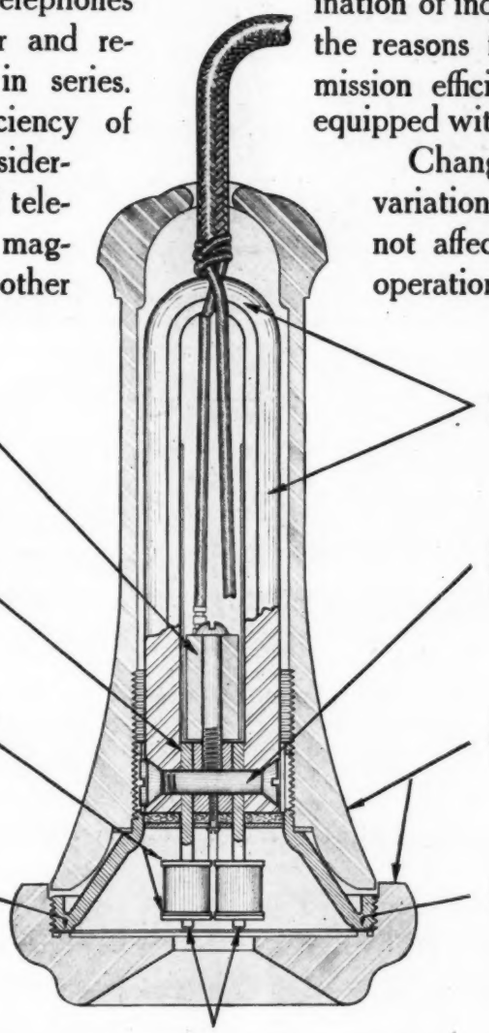
Southern Distributors—Sumter Telephone Supply Co., Atlanta, Ga.
Pacific Coast Distributors—Telephone Electric Equipment Co., San Francisco, and Los Angeles, Cal., Portland, Ore., Seattle, Wash.

No. 28 Direct Current Receiver

Receivers of this type are used in the talking circuits of some of our "Central Energy" telephones wherein the transmitter and receiver are connected in series. The transmission efficiency of such telephones is considerably more than that of telephones equipped with magnetic receivers and with other kinds of direct current receivers. High efficiency of the receiver and the elimination of induction coil losses are the reasons for the superior transmission efficiency of instruments equipped with this apparatus.

Changes in temperature variations and moisture will not affect the adjustment or operation of this receiver.



Cord terminal will receive any type of cord tip.

Perfect insulation of terminals assured by the use of high grade insulating material.

The shell and cap are interchangeable with other types of our receivers.

Diaphragm firmly clamped and at the center of the bearing surface to prevent buckling.

Correctly designed clip for fastening stay cord.

Construction makes permanency of adjustment absolute.

Spoolheads of insulating material to eliminate eddy current losses.

Extra broad clamping surfaces.

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Of course, patriotism and National duty played a part in this, but every investor buys U. S. Bonds eagerly because

He Is Absolutely Sure of His Interest and Principal

The Automatic Telephone Offers Security To Your Investors

The Automatic insures them against increased operators' wages, shorter hours of work and the cost of hiring and training new operators.

It guards against public agitation for better service, because Automatic Service is the best service.

It secures adequate rates for service, for Automatic subscribers are willing to pay fair prices for Service that Satisfies.

It is a guarantee against obsolescence, for the Automatic System is always *Modern.*

It reduces idle investment to a minimum and makes additions easy and economical.

It curbs increasing costs as the business grows, and makes more gross earnings mean more profit, not less.

Your investors, and others from whom you seek capital, will buy your securities more willingly if you offer them the security that comes through installing the Automatic.

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Economical and reliable, it has stood the test of long service, and is pronounced the one perfect pole changer by the leading telephone men of the country.

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Try it yourself—don't take our word for it. You will instantly recognize its superiority over all other drop wires on the market. IRONITE has great tensile strength, never sags or breaks, not affected by heat or cold or storms.

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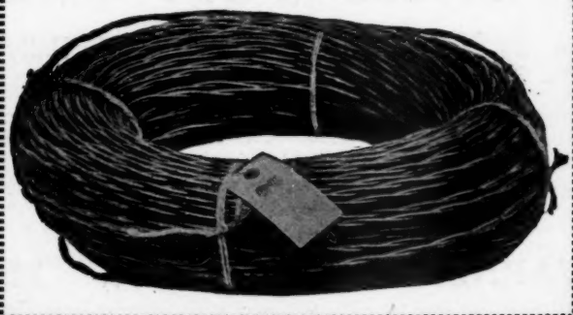

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They are shielded from the influence of external magnetic fields, the movement and magnetic system being enclosed in an iron case permanently mounted in a handsome wooden carrying-box with hinged cover.

The scale has a mirror over which the knife-edge pointer travels. Readings can be made within 1-10 of a division at any part of the scale.

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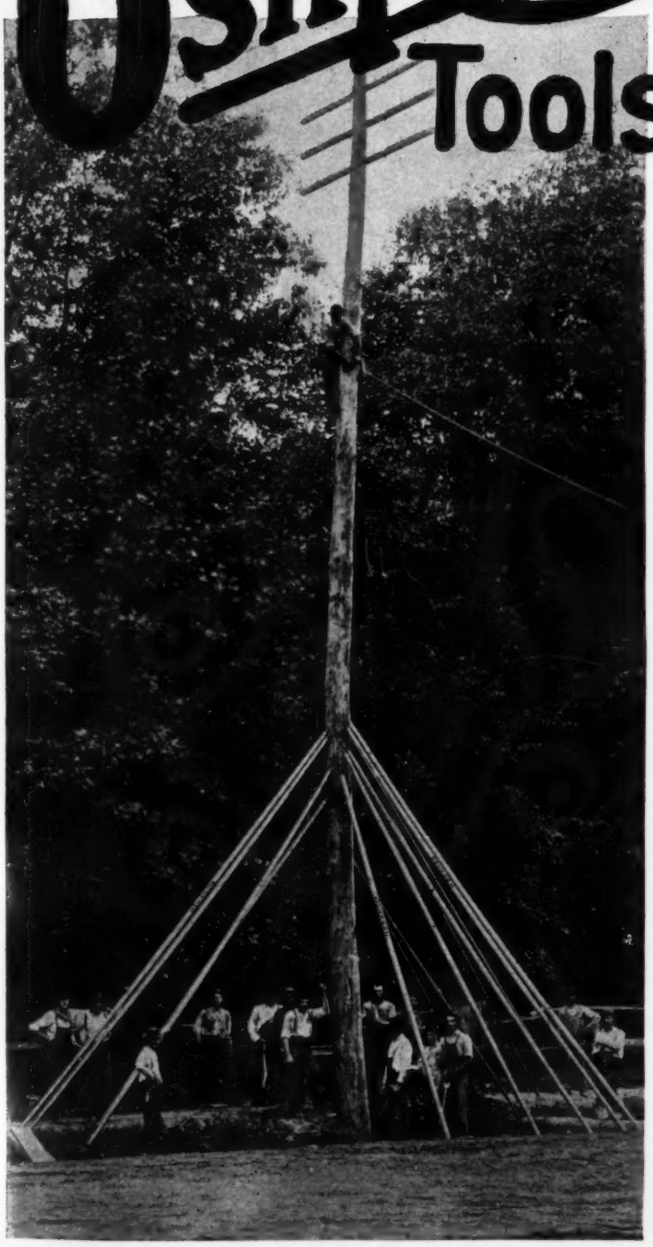

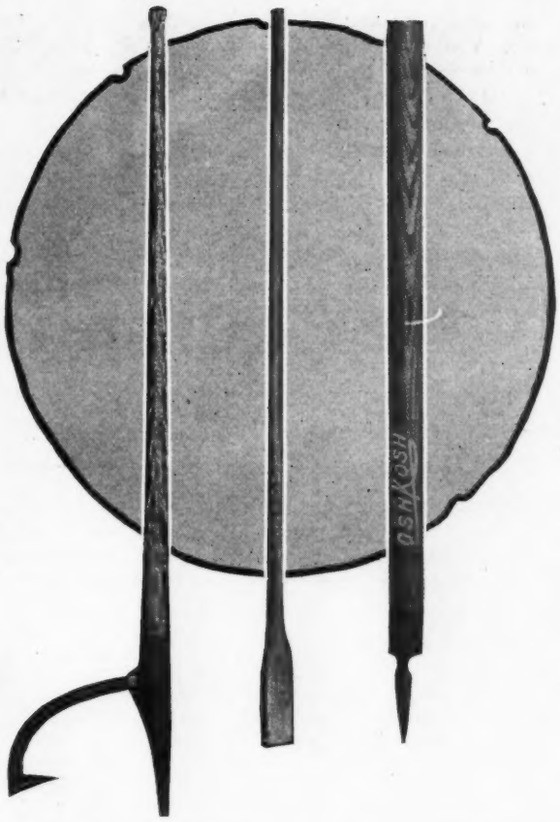

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For every move that has to be made from the time the pole is lifted out of the yard until it is in place ready for the linemen, there is a reliable Oshkosh tool to do the work.

Every one — carrying hook — cant hook — peavy-pike pole — tamping bar — spud — is a tool made in the best way that it is possible to make a pole tool.

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OSHKOSH, WIS.

before your commission with nothing but your bank book and get an increase in rates. You must start today to prepare for that time by finding out where you are. If you know nothing about your plant investment, start an inventory of the physical property with the aid of which an expert can tell you what investment you are entitled to realize returns on.

The source and amount of your receipts can be determined without difficulty, but you will have to be very careful to classify all expenditures. If you can do no more, get a big check book and carefully note on the stubs what each check is drawn to pay. Return all invoices with checks and have them receipted, and retain the paid bills, the cancelled checks, and the check stubs. An expert can then prepare a statement, such as will enable the commission to give your case the consideration of which it deserves.

Be assured that all this is worth while—that telephone service must improve and telephone rates increase in small plants just as they have in large ones. And while misfits and those without faith in the business cannot survive, those who do persevere and help raise the standard of the small plant to its proper level, will be abundantly rewarded.

New Equipment, Cambridge, Ohio

Order Placed by Cambridge Home Telephone Co. for an Entirely New Automatic Central Office Equipment with an Initial Capacity of 3,000 Telephones—Increased Facilities Necessitated by Purchase of Bell Exchange in Cambridge

Entirely new automatic central office equipment, having an initial capacity of 3,000 telephones, has just been ordered by the Cambridge Home Telephone Co., for its exchange in Cambridge, Ohio.

This equipment will serve not only the company's present subscribers, but also the thousand or more stations added to its system through the purchase of the Central District Telephone Co.'s exchange in that city last February.

To accommodate these additional subscribers, and to provide a reasonable margin for immediate growth, required practically the doubling of the Home company's present plant. The officials and directors of the company have, therefore, given very careful study to the question as to how best to accomplish this in the most economical manner, and with the assurance of serving their patrons most satisfactorily.

The present automatic system in Cambridge has been in operation for seven years and in making plans to increase the capacity of the plant the question arose as to whether to add to the existing central office apparatus or to re-equip with entirely new equipment of the latest type. It was felt, however, that the greater ease and economy of maintenance of the latest type of equipment, due to the improvements made, would more than offset the greater investment.

In addition the Cambridge company has placed an order for a four-position toll and rural board, equipped for automatic operation and connected to the long-distance lines of both the Central District and Ohio State companies.

The Home plant at Cambridge was first constructed by William Hoyle and T. W. Scott, and began operating in 1894, with 112 subscribers. Five years later the company was organized and took over the property, the founders retaining a controlling financial interest and becoming members of the board of directors.

The company began operating with telephones using magneto transmitters and enjoys the distinction of being the first Independent company in the United States to use separate transmitters and receivers. The magneto transmitters were soon replaced by battery transmitters, and after about two years of service this equipment was replaced by a board of a more modern type, which remained in service until 1903, when it was replaced by a common battery board. The common battery manual service was then used until July, 1910, when the company installed automatic equipment.

The popularity of the Home company's automatic service has been uninterrupted and the company has enjoyed a most satisfactory growth, from 900 stations in 1910, when the automatic was placed in service, to about 1,600 today, or at the rate of 100 per year. This has been accomplished in the face of a most vigorous competition.

The Cambridge company also owns and operates an exchange at Byesville, Ohio, with over 400 telephones in service, as well as toll lines throughout the county.

The Home company from the first has been a distinctly Cambridge enterprise, and with one exception, has retained the same men on its board of directors since the formation of the company, 18 years ago. They are among the most prominent business men in the community and include William Hoyle, T. W. Scott, H. P. Woodworth, M. L. Hartley, C. C. Cosgrove, J. M. McKetrick, and D. M. Hawthorne.

The officers are J. M. McKetrick, president; M. L. Hartley, vice-president; Mary C. Flynn, secretary; William Hoyle, treasurer, and Fred L. Sears, manager, who has been with the company for the past 13 years and has held his present position since 1911.

Cambridge is one of the most thriving and prosperous cities in Ohio, and has enjoyed a very substantial growth for several years past. Its present population is approximately 15,000 and of late there has been an industrial development which promises to make it an important manufacturing center. With the installation of this new equipment, Cambridge will have in service one of the most modern and thoroughly up-to-date telephone systems in America, of which the company and city may well be proud.

OPPORTUNITIES (Continued From Page 35)

EVEN IF THERE IS SOME PART OF YOUR APPARATUS which is almost worn to a "frazzle," don't ditch it—send it to our repair experts. They'll make it like new. We give the same attention to a small as well as a large order. The Suttle Equipment Co., Olney, Ill.

WANTED—Used and obsolete telephone switchboards of all makes and specifications. Let us quote you a price on that old equipment.
McGINNIS-SMITH ELECTRIC CO.,
Lawrence, Kans.

POSITION WANTED

Man eighteen years' experience all departments Independent and Bell, now with company middle west, desires position in mountain states far west or south. Specialized in traffic and commercial. General manager or similar position desired. Address 2886, care of TELEPHONY.

A married man 40 years old, good executive, desires position as manager with live telephone company. Box 355, Milford, Ill.

POSITION WANTED—By capable operator with four years' experience. Can furnish the best of references. Marie A. Scott, Truman, Minn., Box 102.

WANTED—About 2 dozen second hand No. 240 E. Western Electric Co. bells. Must be in good condition. United Telephone Company of Ottawa, Ill.

FOR SALE

FOR SALE—Nice exchange, price $4,000 cash. Large territory to build to. Address 2856, care of TELEPHONY.

OPPORTUNITIES!

Copy for classified advertising for the current issue should reach us not later than Wednesday morning when forms close. Rates for classified advertising five cents a word. Minimum advertisement one dollar. Cash must accompany advertising.

"REBUILT" TELEPHONE APPARATUS

and exchange equipment saves you 30 to 50 per cent without sacrificing quality or efficiency.

SWITCHBOARDS

— Telephones—Apparatus — Protection Equipment — Cable — Everything you need for the installation and operation of a complete exchange—Magneto or Central Energy—of the best and most reputable manufacturers.

TEN YEARS' SUCCESSFUL OPERATION

of our "Rebuilt" Equipment Department puts it past the experimental stage. Quality and price will make you a permanent customer. Better investigate.

Ask for Our Free No. 78 Bargain Bulletin. Address, "Rebuilt" Equipment Department.

PREMIER ELECTRIC CO., Chicago, Ill.

"REBUILT" when connected with PREMIER means something.

DIRECTORY HANGERS

WE BEG TO DIRECT YOUR ATTENTION to the Universal Wire Loop, an improvement upon the ordinary string loop for hanging up catalogues, directories, telephone books, prices current, etc. Write us for prices and samples. Wire Loop Mfg. Co., 75 Shelby St., Detroit, Mich.

TELEPHONE SUPPLIES

WE ARE JOBBERS. Get our prices on telephones, wires, pins, brackets, poles, cross arms, glass insulators—pole line hardware. Indianapolis Elec. Supply Co., Indianapolis, Ind.

CONSTRUCTION SUPPLIES—Anything you need for your construction work can be ordered from us at prices that can't be beat. Doubleday-Hill Elec. Co., 721 Liberty Ave., Pittsburgh, Pa. Southern Warehouse, 727 12th St., N. W., Washington, D. C.

Kentucky Equipment Co.

Dealers in

Telephone and Central Department Equipment

We are in the market for all kinds of old or worn out equipment.

Write us what you have

1020 W. Harrison St., CHICAGO

Sandwich Pole-Changers

PARTS AND REPAIRING

RAILWAY TELEPHONE MFG. CO.
9 So. Clinton St., Chicago, Ill.

HELP WANTED

Telegraph and Radio operators, electricians and linemen wanted for Signal Corps, U. S. Army. Pay ranges, according to rank and service, home or foreign, from $15 to $90 a month, and in addition rations, quarters, clothing and medical attendance are furnished. Signal Corps offers unusual opportunities for foreign service and rapid promotion to young men of character, intelligence and ability, who have had electrical training, particularly as telegraph or radio operators. For detailed information write to Chief Signal Officer, U. S. Army, Washington, D. C.

WANTED—Wire chief in northern Indiana town 4,000. Must have experience in switchboard and cable work. State age, education and experience. Address 2883 care of TELEPHONY.

WANTED—A combination cable and trouble man on a magneto plant in southern Michigan. No cigarette or booze fighters wanted, but a bright, energetic man who can produce results. State salary wanted per month, whether married or single. Address 2879, care of TELEPHONY.

WANTED — First class cableman. Must know how to make all necessary tests. First class wages to the right man. Steady employment. Address 2880, care of TELEPHONY.

WANTED—A switchboard repair man on a twelve-position local and common battery switchboard and four-position toll board. City of 18,000 in North Central Illinois. Address 2871, care of TELEPHONY.

WANTED—Young man for position in Western Pennsylvania for telephone work in Central Office. Opportunity very good. State age, education and experience. Address 2855, care of TELEPHONY.

ESTIMATOR—Telephone switchboard work. Permanent position open for a man familiar with telephone switchboard installation work to do cost estimating. Salary $100 to $125 per month to start. Age 30 to 35. Give education and experience. Address 2876, care of TELEPHONY.

WANTED—Man who is familiar with telephone equipment. Position at start is pricing and estimating and will pay from $21.00 to $28.00 per week, depending on training and ability. Location in Chicago. Opportunity for advancement particularly good. Prompt action will be taken on replies giving full particulars and indicating fitness for the work. Address 2870, care of Telephony.

WANTED—First-class trouble lineman for work on exchange of 2,000 stations, common battery and magneto, rural. Wages $80.00 per month, permanent position. Address, with references, Petroleum Telephone Company, Franklin, Pa.

WANTED—Married man as assistant to an engineer of three Independent Telephone Companies, having 20,000 stations, located in Indiana and Illinois. Must be able to plan cable lay-outs and handle engineering office work. Reply 2873, care of TELEPHONY.

POSITION WANTED

TELEPHONE MAN of wide experience and demonstrated ability, 8 years with present employer, wants to connect with a telephone company or public service commission doing big business, preferably in one of the eastern states; effective Sept. 1st, or such time as is fair to all parties. Read the following letter:

The bearer ——— has been in the employ of this company for the period of nearly two years in the capacity of ———, during which time his services have been most satisfactory. ——— has had entire charge of the work of consolidating the exchanges of the ——— company with the exchanges of this company and it was due to his excellent management and thorough knowledge of large affairs in the telephone work that the consolidation was accomplished with a minimum amount of trouble and complaint. Any company desiring the services of a competent ——— will find ——— entirely reliable and competent to handle large undertakings and forces of men, and it is with pleasure that this company testifies to his good qualities. It is with regret that his services are dispensed with, and this company will at any time reinstate him in his former capacity whenever there is work requiring a man of his ability. Address 2881, care of TELEPHONY.

MISCELLANEOUS

STANDARD TELEPHONE REPAIR COMPANY — INDEPENDENT LOCAL AND LONG DISTANCE TELEPHONE — CHICAGO, ILL.

HERE ARE SOME BARGAINS.

1 Dean Central Office Protector for 200 lines with connecting rack in quarter sawed oak cabinet with glass doors. Size 4x5x1 ft. Just like new, for $45.00.

Receiver Cords, NEW, only 10c each, as long as the supply lasts. Pony No. 9 glasses at 2½c each.

1 International Switchboard, 100 lines' capacity, 50 drops installed, 10-cord circuits, $75.00.

1 American Electric Switchboard, 200 lines' capacity 80 drops installed, 10-cord circuits, $150.00.

Write us for Catalog of Rebuilt Telephones.

EXCEPTIONAL BARGAINS.

Act quick.

3,500 Pony Glasses No. 9 and double grove at $2.50 per 100. The whole lot, 3,500, for $70.00.

Receiver Cords (new), tip on both ends, 10c each.

Standard Telephone Repair Co., No. 208 North Fifth Ave.

BUYERS' REFERENCE

The letter with accompanying number indicates the name of advertiser as given in full in the Alphabetical Index to Advertisers, on the opposite page. *When making known your wants* to any company listed herein, please mention TELEPHONY.

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ROEBLING

Double Galvanized

TELEPHONE WIRE

E. B. B., B. B. and Steel GRADES

JOHN A. ROEBLING'S SONS COMPANY

Trenton, New Jersey

ORANGEBURG Fibre Conduit

The Fibre Conduit Company

ORANGEBURG, N. Y.

New York Boston Chicago San Francisco

Rebuilt Bargains

MONARCH 3 bar 1000 ohm compact telephones . . **$7.00**

WESTERN ELECTRIC CO. 3 bar 1000 ohm compact telephones. **7.00**

WESTERN ELECTRIC CO. 3 bar 1000 ohm commom battery type magneto telephones, walnut woodwork **6.50**

We can furnish any resistance ringer in the above telephones at slight changes in price.

Let us know your requirements and we will save you money.

Rebuilt Telephone Equipment Company

2127-2129 West 21st Street Chicago, Ill.

Eureka Terminal Blocks

EUREKA

Eureka Cable Hangers

FIBRE INSULATORS AND . . TERMINAL BLOCKS . .

Be Up-to-date

The World's Best Standard in all Correct Construction. EUREKA Insulated Nails are extensively employed by the leading Telephone Companies. Samples and particulars furnished promptly on request.

Use the Best

Eureka Insulated Nails

Manufactured by

EUREKA SUPPLY CO.

Manufacturers of PATENTED SPECIALTIES

SEWELL, NEW JERSEY

Eureka Fibre Insulators

"Red Devil" Bonded Linemen's Tools

could not possibly mean anything but economy for you. Investigate.

SMITH & HEMENWAY CO., Inc., 87 Chambers St., NEW YORK CITY

ERICSSON TELEPHONES

If you desire telephones of quality and high class appearance, standardize on the Ericsson line.

Forty years of experience behind our products.

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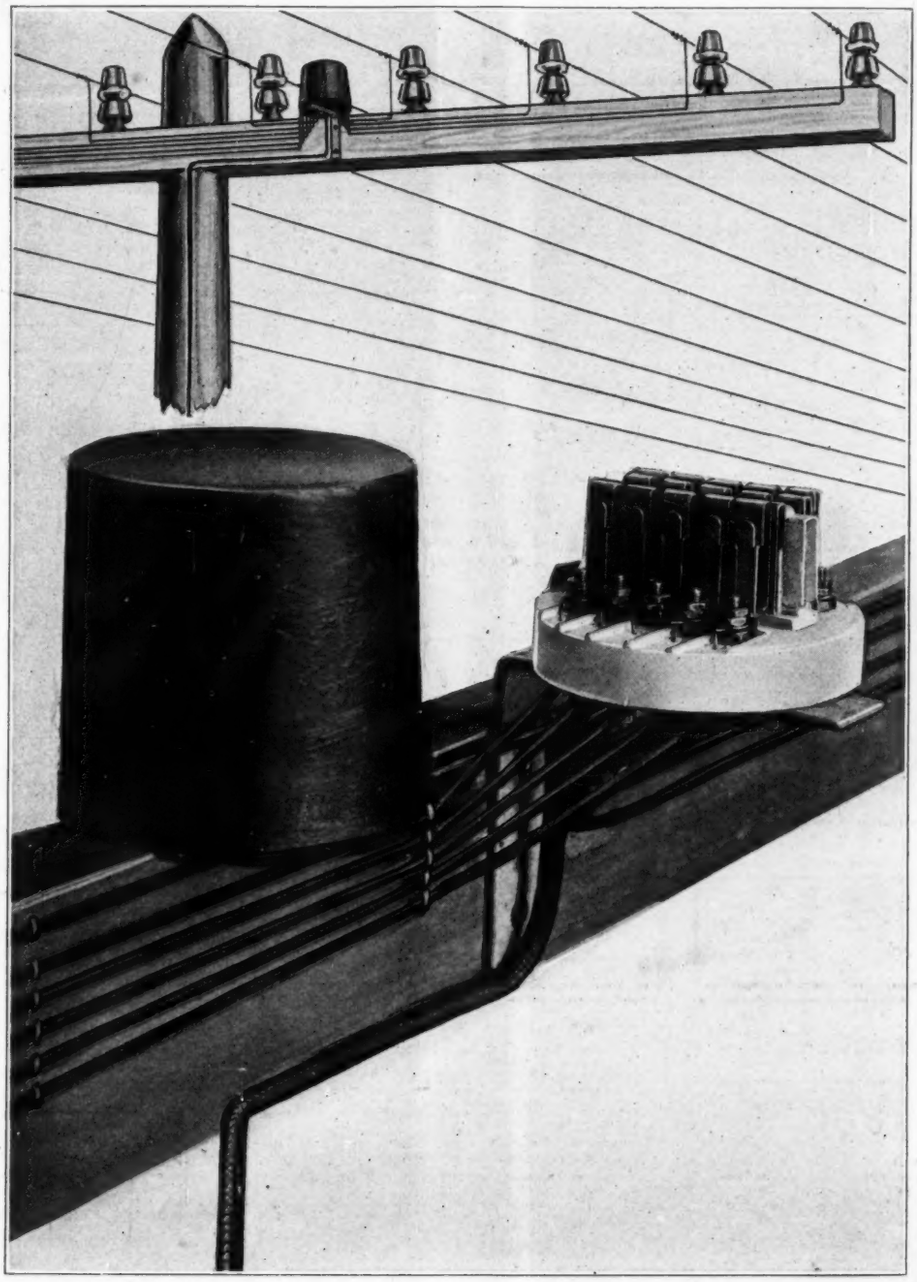

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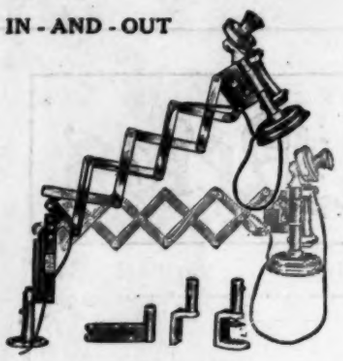

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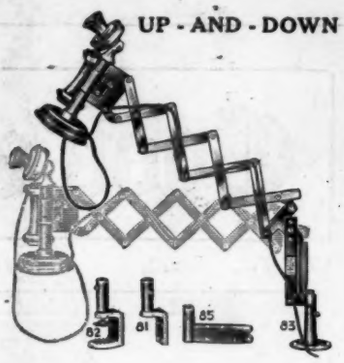

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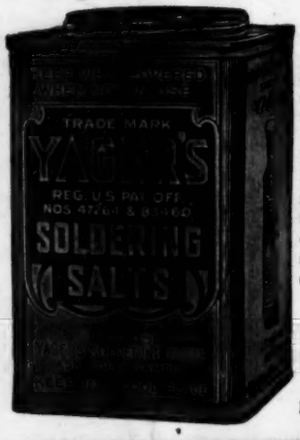

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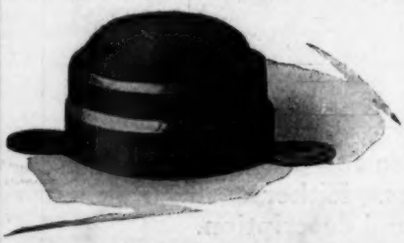

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